

**IN THE UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA**

IN RE PORK ANTITRUST
LITIGATION

Case No. 0:18-cv-01776 (JRT-HB)

**DECLARATION OF HAL J. SINGER,
PH.D. IN SUPPORT OF CONSUMER
INDIRECT PURCHASER
PLAINTIFFS' MOTION FOR CLASS
CERTIFICATION**

This Document Relates to:

All Consumer Indirect Purchaser Plaintiff
Actions

*** HIGHLY CONFIDENTIAL PURSUANT TO PROTECTIVE ORDER ***

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INTRODUCTION AND ASSIGNMENT

1. Plaintiffs represent a proposed class of indirect pork purchasers (the “Class” or “Class Members”), defined as consumers who have purchased raw pork for personal consumption at the end of the food distribution chain from June 28, 2014 to June 30, 2018 (the “Class Period”).¹ Plaintiffs allege a conspiracy to artificially inflate the price and restrain the supply of pork in the United States among several U.S. meat processing companies, including Clemens, Hormel, JBS USA, Seaboard, Smithfield, Triumph, and Tyson (collectively “Defendants”).² Plaintiffs allege that starting in 2009 and continuing until at least June 30, 2018 (the “Conduct Period”),³ Defendants entered into an illegal conspiracy and “coordinated to fix, raise, maintain and stabilize pork prices.”⁴ To the extent that this conspiracy or its effects persisted after June 30, 2018, I define July 1, 2018 through the present as the “After Period.”

2. Plaintiffs allege that Defendants used a third-party data company, Agri Stats, as an information exchange to “obtain and monitor critical and competitively sensitive business information regarding each other’s production metrics,” allowing them to effectuate a “stable and successful anticompetitive cartel.”⁵ Per the Complaint, Defendants

¹ *In Re Pork Antitrust Litigation*, Case No. 18-cv-1776 (JRT/HB), Consumer Indirect Purchaser Plaintiffs’ Fourth Amended Consolidated Class Action Complaint (January 12, 2022) [hereafter *Complaint*], ¶14. *See also* CIPP’s Motion for Class Certification (May 2, 2022). For the purposes of data analysis using monthly data, I omit the final two days of June and define the Class Period as July 2014 through June 2018.

² *Complaint* ¶15.

³ *Id.* ¶¶6, 11, 14. Note that the Class Period and the Conduct Period differ due to a statute of limitations.

⁴ *Id.* ¶6.

⁵ *Id.*

participating in the Agri Stats service provided detailed and confidential production data to Agri Stats on a weekly and monthly basis;⁶ in return, Defendants allegedly received detailed, timely, and poorly anonymized data on their industry rivals.⁷ These reports allowed Defendants to directly monitor their rivals prices, such as when Smithfield used Agri Stats to have [REDACTED]

[REDACTED]⁸ In addition, Agri Stats allegedly provided each Defendant with individually tailored “price-raising opportunities” that allowed participants to calculate exactly how far an individual Defendant could artificially inflate prices.⁹ For purposes of this report, I refer to Defendants’ alleged collusion, including their participation in and use of the Agri Stats data to effectuate an agreement to stabilize the price of pork, as the “Challenged Conduct.”

3. I understand that the Repealer Jurisdictions are those states that have “repealed” the Supreme Court’s holding in *Illinois Brick Co. v. Illinois*, 431 U.S. 720 (1977) and that provide standing to indirect purchasers of a price-fixed good. For the purposes of this motion, I have been instructed by Plaintiff’s counsel that those jurisdictions are: Arizona, California, District of Columbia, Florida, Hawaii, Illinois, Iowa, Kansas, Maine, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Hampshire, New Mexico, New York, North

⁶ *Id.* ¶4.

⁷ *Id.* ¶84.

⁸ SMITHFIELD00464013, a 2015 email from the President of Smithfield’s Fresh Pork Division stated that he challenged his business managers to use Agri Stats to [REDACTED]

[REDACTED] The document implies that Smithfield was able to monitor JBS’s prices.

⁹ *Complaint.* ¶36.

Carolina, North Dakota, Rhode Island, South Carolina, Tennessee, Utah, and West Virginia.¹⁰

4. Plaintiffs have defined the pork products (“Class Pork Products”) in the proposed class as pork bacon and the following types of raw pork, whether fresh or frozen: bellies, loins, ribs, shoulders, or pork chops. Excluded are any products that are marketed as organic, no-antibiotics ever, or are pre-cooked, or any product other than bacon that is marinated, seasoned, flavored, cooked, or breaded. For the purposes of this report, I will categorize Class Pork Products into five categories: Bacon, Belly, Loin, Rib, and Shoulder.¹¹

5. Counsel for Consumer Indirect Purchaser Plaintiffs (“Plaintiffs”) has asked me to address the availability of methods common to the class to demonstrate:

- Whether Defendants collectively have market power, either via direct evidence or indirectly via high market shares and entry barriers in a relevant antitrust market;
- Whether qualitative evidence, such as Defendants’ information exchanges through Agri Stats and other record documents relating to the Challenged Conduct, is consistent with collusion and inconsistent with unilateral conduct;
- Whether quantitative evidence, such as econometric analysis of Defendants’ transactional data, shows widespread impact to the class, and that the Challenged Conduct is economically and statistically significantly associated with artificially inflated prices, beyond what can be explained

¹⁰ I understand that the class period for Kansas, Tennessee, and South Carolina class members is proposed to begin June 28, 2015.

¹¹ This categorization broadly follows the USDA categorization of pork primals, with the exception that the “Picnic” and “Butt” shoulders are combined to “Shoulder,” and “Bacon” is made distinct from “Bellies. This change was made in light of how Defendants and third parties characterize their products in their internal data. Note that I explicitly exclude all “Ham”, “Ground Pork”, “Sausage”, “Lunchmeat”, “Offal”, “Specialty” or “Deli” cuts, “Byproducts”, and any non-pork products.

by competitive factors, and whether this evidence is consistent with collusion and inconsistent with unilateral conduct;

- Whether any artificial price inflation due to the Challenged Conduct would have been passed through and experienced by Class Members; and
- Whether common methods and evidence can be used to quantify the damages to the class caused by Defendants' alleged collusion.

6. I have not been asked to opine on whether Defendants colluded or whether such an agreement would violate antitrust law. For purposes of my assignment, I assume Plaintiffs' allegations regarding the existence of such a collusive agreement to be true.

SUMMARY OF OPINIONS

7. I have reached the following opinions:

- Defendants collectively have market power in the pork market, as directly evidenced by their ability to artificially inflate prices above competitive levels, and indirectly evidenced by a market definition exercise;
- Qualitative evidence in the record, including Defendants' information exchanges through Agri Stats and other record documents, is consistent with collusion and inconsistent with unilateral conduct;
- Quantitative evidence shows widespread impact to the class, and the Challenged Conduct is economically and statistically significantly associated with artificially inflated prices;
- Artificial price inflation due to the Challenged Conduct impacted all Direct Purchasers and passed through to impact all Class Members; and
- Common methods and evidence can be used to quantify the damages to the class caused by Defendants' alleged collusion.

8. My report is organized as follows: In Part I, I provide a brief background of the pork industry, highlighting only those salient features that are needed to apply the economic tests in the remainder of my report. I explain the economics behind price-fixing conspiracies generally, and the conspiracy alleged here specifically.

9. In Part II, I use evidence common to the class to demonstrate that Defendants collectively wield market power. I do so using both direct and indirect evidence. The direct evidence includes the results of my pricing model, which shows that Defendants artificially inflated the price of Class Pork Products above competitive levels during the Class Period. Such elevation in Class Pork Products prices would not have been possible in the absence of market power. The indirect evidence includes a standard SSNIP test, which defines a relevant antitrust market as pork products within the United States. I then show that Defendants dominate this market, holding a collective market share of approximately 80 percent, which is protected by significant entry barriers.

10. In Part III, using evidence common to the class, I analyze the *qualitative* evidence that the Defendants were engaged in an alleged price-fixing cartel. I do so by applying standard principles for analyzing qualitative evidence from the extensive economics of cartel behavior. Using this economic lens, I review record evidence documenting Defendants’ participation in and use of Agri Stats as a medium to exchange data. I show that Defendants shared *significant* amounts of “competitively sensitive information,” via the Agri Stats reports.¹² I then demonstrate that the Defendants’ information exchanges through Agri Stats are consistent with collusion and inconsistent with competition, based on criteria recognized by standard economic theory.

¹² The FTC defines competitively sensitive information as “information relating to price, cost, output, customers, or strategic planning.” See Michael Bloom, *Information exchange: be reasonable*, FTC.GOV (Dec. 11, 2014), citing DEPARTMENT OF JUSTICE & FEDERAL TRADE COMMISSION, *Antitrust Guidelines for Collaborations Among Competitors* (April 2000).

11. In Part IV, using common methods and evidence, I analyze the *quantitative* evidence of the Challenged Conduct by applying standard empirical methods used in the antitrust litigation context. Specifically, I compare prices during a “contaminated” time period (the “Conduct Period”) when the Challenged Conduct was allegedly in effect, to prices during a “Benchmark Period” when the Challenged Conduct was absent. To account for other variables that might explain any differences in pricing, I use standard multiple regression methods to control for differences between the Benchmark Period and Conduct Period.¹³ This regression shows that Class Pork Products prices were artificially inflated above competitive levels by at least 12.8 percent during the Conduct Period, holding constant other variables.

12. In Part V, I show that nearly all Direct Purchasers of Class Pork Products from Defendants paid inflated prices. I then apply standard empirical methods to estimate the degree to which these inflated Class Pork Products prices are passed on to end customers. Specifically, I estimate a pass-through rate by regressing the prices charged by Direct Purchasers to their customers on the prices charged by Defendants to Direct Purchasers. I estimate that as economic theory predicts for firms (Direct Purchasers) that lack selling

¹³ See, e.g., Johnathan Baker & Daniel Rubinfeld, *Empirical Methods in Antitrust Litigation: Review and Critique*, 1 AMERICAN LAW AND ECONOMICS REVIEW (1999) 386-435, 392 [hereafter, Baker & Rubinfeld (1999)]. See also James F. Nieberding, *Estimating Overcharges In Antitrust Cases Using A Reduced-Form Approach: Methods And Issues*, 9(2) JOURNAL OF APPLIED ECONOMETRICS 361-380 (2006) [hereafter, Nieberding (2006)]; Daniel Rubinfeld & Peter Stienen, *Quantitative Methods in Antitrust Litigation*, 46 LAW AND CONTEMPORARY PROBLEMS 69-144, 123 n.77 (1983) [hereafter, Rubinfeld & Stienen (1983)]; PROOF OF CONSPIRACY UNDER FEDERAL ANTITRUST LAWS 224-230 (American Bar Association 2010) [hereafter, ABA Proof of Conspiracy].

power, approximately 100 percent of any price increase at the wholesale level is passed through to indirect purchasers in the retail price increase of Class Pork Products.

13. In Part VI, I review the qualitative and quantitative evidence for each category of Class Pork Products and for each Defendant and show that the Challenged Conduct implicates all products and Defendants.

14. In Part VII, I show how common evidence and methods can be used to calculate damages to the Class. I use Defendants' overcharge amount of 12.8 percent and the a pass-through to class members of 100 percent. Restricting to Defendants' sales during the Class Period made directly to retail establishments, I estimate class-wide damages of \$1.370 billion. If I include sales made to resellers who then sell to retail establishments, I estimate class-wide damages of \$1.621 billion, or approximately \$12.63 per Class Member over the Class Period.

15. In Part VIII, I demonstrate that any *competitive* explanations for the observed price inflation, such as increases in supply or demand, are implausible and are ruled out by my econometric model. I demonstrate that no individual Defendant could have unilaterally and profitably implemented the observed price inflation during the Class Period, particularly given the commodity nature of pork. For completeness, I provide a mapping of my economic analysis into certain "plus factors" that I understand are sometimes used by courts to determine the existence of a price-fixing conspiracy.¹⁴

¹⁴ See, e.g., ABA PROOF OF CONSPIRACY at 69-91.

16. I conclude that common methods and evidence demonstrate Anticompetitive Effects and Common Impact to the Class, and that formulaic methods quantify Aggregate Damages attributable to the Challenged Conduct. The opinions expressed in this report reflect my review of evidence, data, and other relevant materials to date. At the time of filing, data production is ongoing. I reserve the right to supplement or amend my opinions should new materials or information become available.

QUALIFICATIONS

17. I am a Managing Director at Econ One and an Adjunct Professor at Georgetown University's McDonough School of Business, where I have taught Advanced Pricing to MBA candidates since 2014.

18. My scholarship, which focuses largely on competition issues, has appeared in dozens of legal and economic journals, and I have co-authored two books and multiple book chapters.

19. On several occasions, I have testified before the United States Congress on the interplay between antitrust and sector-specific regulation. Courts and regulatory agencies have widely cited my scholarship and testimony. The Federal Communications Commission, the Federal Trade Commission, and the Department of Justice have all referenced my work in agency reports and orders.

20. I have served as an expert for the Canadian Competition Bureau and for U.S. State Attorneys General in antitrust matters. In 2018, I received an antitrust enforcement award from the American Antitrust Institute for my work in the *In re Lidoderm Antitrust Litigation*.

21. I earned M.A. and Ph.D. degrees in economics from Johns Hopkins University and a B.S. *magna cum laude* in economics from Tulane University.

22. My curriculum vitae appears in Appendix 1 to this report and contains a list of cases in which I have served as a testifying expert since 2014 and a list of publications I have authored in the previous ten years. Several of the antitrust cases in which I have testified raise similar issues to the instant matter, including *In re New York City Bus Tour Antitrust Litigation* (involving an alleged price-fixing conspiracy among two bus operators); *In re Airline Baggage Fee Antitrust Litigation* (involving an alleged price-fixing conspiracy among two airlines); *In re Foreign Exchange Benchmark Litigation* (involving an alleged price-fixing conspiracy among foreign exchange dealers); *In re Capacitors Antitrust Litigation* (involving an alleged price-fixed conspiracy among Japanese capacitors makers and their U.S. affiliates); *In re London Silver Fixing, Ltd. Antitrust Litigation* (involving an alleged price-fixing conspiracy among silver market markers); and in many pay-for-delay matters in the pharmaceutical industry (involving agreements not to compete between brand and generic manufacturers).

23. I have no financial stake in the outcome of this case. Econ One is being compensated for my work in this case at the rate of \$885 per hour. Appendix 2 contains a list of the materials upon which I relied in forming my opinions for this report. My report relates solely to the issues involved in this litigation.

I. BACKGROUND

A. The U.S. Pork Industry

24. The United States is the world's third largest producer of pork products and a major net exporter.¹⁵ The raising and processing of pigs and hogs is geographically concentrated in the American Midwest, North Carolina, Oklahoma and Texas, and it has followed the general agricultural trend of consolidation under large agribusiness.¹⁶ The United States Department of Agriculture (USDA) reports that the number of hog farms has declined by 70 percent since 1990, reflecting the trend in consolidation.¹⁷ Similarly, hog processing (like beef and poultry) has become increasingly concentrated, drawing recent economic, legal, and political scrutiny. The White House recently noted that the "top four hog-processing firms controlled 33% of the market in 1976, compared to 66% today," and went on to note that hog processors occupy a "hyper-consolidated pinch point in the supply chain" that allows them to "driv[e] down earnings for farmers while driving up prices for consumers."¹⁸

¹⁵ Economic Research Service, *Hogs & Pork*, U.S. DEPARTMENT OF AGRICULTURE (accessed Mar. 2022), available at <https://www.ers.usda.gov/topics/animal-products/hogs-pork/#:~:text=The%20United%20States%20is%20the,pork%20production%20in%20most%20years>.

¹⁶ *Id.* Economic Research Service, *Hogs & Pork: Sector at a Glance*, U.S. DEPARTMENT OF AGRICULTURE (accessed Mar. 2022), available at <https://www.ers.usda.gov/topics/animal-products/hogs-pork/sector-at-a-glance/>.

¹⁷ *Id.*

¹⁸ Brian Deese, Sameera Fazili, and Bharat Ramamurti, *Addressing Concentration in the Meat-Processing Industry to Lower Food Prices for American Families*, THE WHITE HOUSE (Sept. 8, 2021), available at <https://www.whitehouse.gov/briefing-room/blog/2021/09/08/addressing-concentration-in-the-meat-processing-industry-to-lower-food-prices-for-american-families/>.

25. Pork is a fungible, commodity product.¹⁹ Having removed the product from its package, a pork from one processor is indistinguishable from a pork from another processor.²⁰ From a domestic consumption perspective, pork is a staple American food product. It is one of the major livestock meat species consumed in the United States, along with chicken and beef, with Americans consuming on average over 30 pounds of pork per year,²¹ and average consumers making fresh pork purchases six to seven times per year.²² Indeed, pork accounts for 32 percent of the weighing that goes into the “Meat” category of the Consumer Price Index, which Bureau of Labor Statistics uses to measure general

¹⁹ See, e.g., Julie Hogeland, *Managing uncertainty and expectations: The strategic response of U.S. agricultural cooperatives to agricultural industrialization*, 3 JOURNAL OF CO-OPERATIVE ORGANIZATION AND MANAGEMENT 60–71, 67 (2015) (“Hogs were systematically moved from one stage of production to another according to their biological requirements. For example, feeder pigs progressed from the nursery to grow-out to finishing to market (ready) hogs. Each stage was accompanied by specific feeding regimens and potential housing adjustments. *Moreover, consistent genetics meant that the hogs were predictably lean with standardized pork cuts.*”) (emphasis added). Defendants referred to Pork as a commodity market in their internal discussions. SMITHFIELD01163997, a May 2016 email from Smithfield’s Dhama Thamodaran, [REDACTED] TF-P-000681324 at -1408, a 2016 Tyson Pork Situation Assessment and Strategic Plan. The first critical vision element is to [REDACTED] TRI0000037014 at slide 7, Tyson Agristats and Related Plant and Sales Analyses Q1 – 2015, [REDACTED]

²⁰ As Senior Pricing Manager Robert Moore of Smithfield put it, [REDACTED] because [REDACTED] Deposition of Robert Moore (Dec. 21, 2021) at 20:24-21:15. Daniel Groff from Clemens testified that fresh pork is a [REDACTED] Deposition of Daniel Groff (Dec. 15, 2021) at 38:11-13; Deposition of Brian Taphorn (Jan. 25, 2022) at 183:19-22 (referencing Seaboard’s sale of [REDACTED])

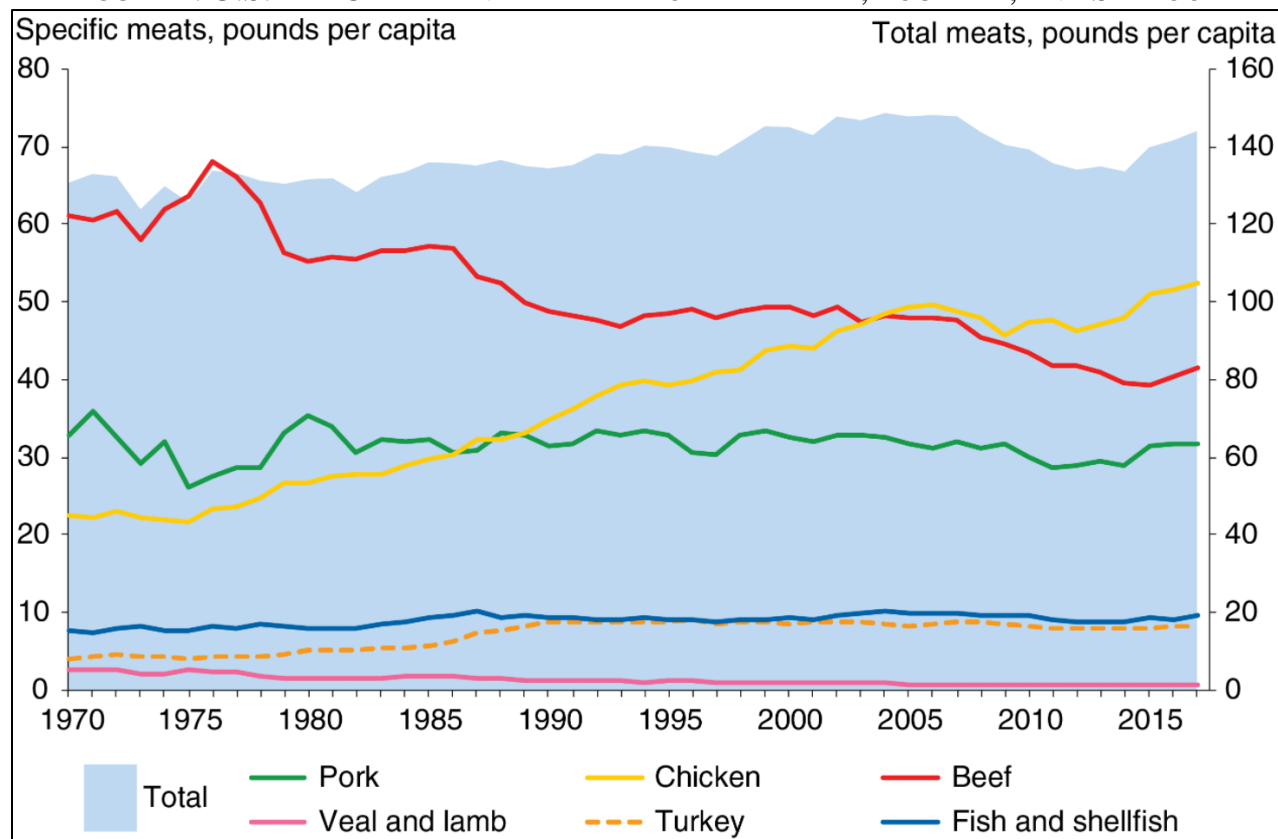
²¹ Figure 1. Fish, shellfish, turkey, veal, and lamb are consumed in much smaller quantities.

²² See, e.g., SMITHFIELD00327178 at -7205, a March 2018 [REDACTED] news bulletin, reading [REDACTED]

[REDACTED] See also TF-P-001876095 at -6107, a December 2017 National Pork Board report stating, [REDACTED]

consumer-facing inflation.²³ Figure 1 below shows that U.S. per capita consumption of pork has remained steady over time, as consumption of chicken has risen and consumption of beef has dropped.

FIGURE 1: U.S. PER CAPITA AVAILABILITY OF RED MEAT, POULTRY, AND SEAFOOD

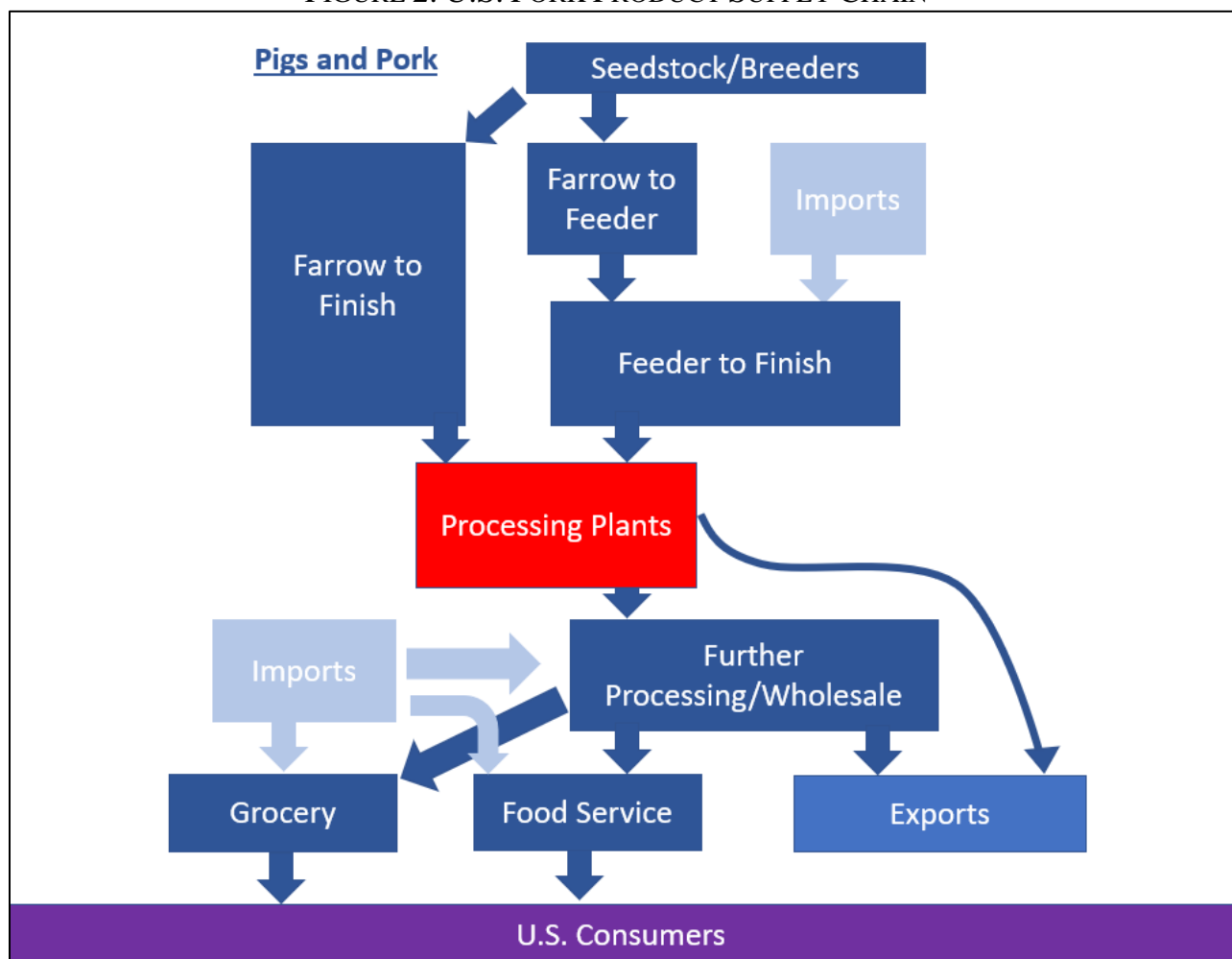


Source: <https://www.ers.usda.gov/amber-waves/2019/december/us-per-capita-availability-of-red-meat-poultry-and-seafood-on-the-rise/>

26. The pork supply chain is summarized in Figure 2 below and can be described in three general steps: (1) the raising of live pigs for meat, (2) pig slaughter and processing into pork products, and (3) distribution and sale to the end consumers. Note that the terms “pig” and “hog” are used interchangeably.

²³ *Consumer Price Index: Relative importance of components in the Consumer Price Indexes: U.S. city average, December 2020*, BUREAU OF LABOR STATISTICS (accessed Mar. 2022), available at <https://www.bls.gov/cpi/tables/relative-importance/2020.htm> (0.322/1.026=.323).

FIGURE 2: U.S. PORK PRODUCT SUPPLY CHAIN



Source: <https://www.whitehouse.gov/briefing-room/blog/2021/09/08/addressing-concentration-in-the-meat-processing-industry-to-lower-food-prices-for-american-families/>

27. The raising of live pigs (step one) begins with the breeding or “farrowing” of a pig litter. For decades, pigs have been genetically bred to be leaner yet heavier than their wild predecessors.²⁴ Pigs are birthed in litters of ten to twelve and are weaned at two to four weeks of age, when they are about ten to fifteen pounds. Historically, the act of feeding and growing pigs was then split into two distinct phases with physically separate locations (called

²⁴ Pork Checkoff, *Quick Facts: The Pork Industry at a Glance*, NATIONAL PORK BOARD (July 2015) at 49, available at <https://porkgateway.org/wp-content/uploads/2015/07/quick-facts-book1.pdf>.

either “growing” or “feeding” and then “finishing”). But today it is common for pigs to spend the rest of their life at a single site.²⁵ Regardless, the entire “Farrow-to-Finish” grow cycle from a pig’s birth takes 22 to 26 weeks and yields a live pig weighting 240 to 270 pounds.²⁶ These live pigs are then shipped off to an auction market or directly to pork processors for slaughter.

28. In the second step, the pork processors (“meat packers” or “slaughterhouses”) kill and butchered pigs into pork products at specialized industrial processing plants capable of killing hundreds or thousands of pigs per hour.²⁷ Pigs are cut into large six major “primal” sections that come from the initial bodily separation of the pig, shown in Figure 3 below.²⁸ From there, the primal sections are cut into a number of different sub-primal styles, which are then further processed into individual consumer cuts of pork.²⁹ The processing of individual cuts may occur in the same processing plant as the original kill, or it may occur in a separate processing plant with more specialized equipment, as is the case with some bacon products.

²⁵ *Id.* at 54.

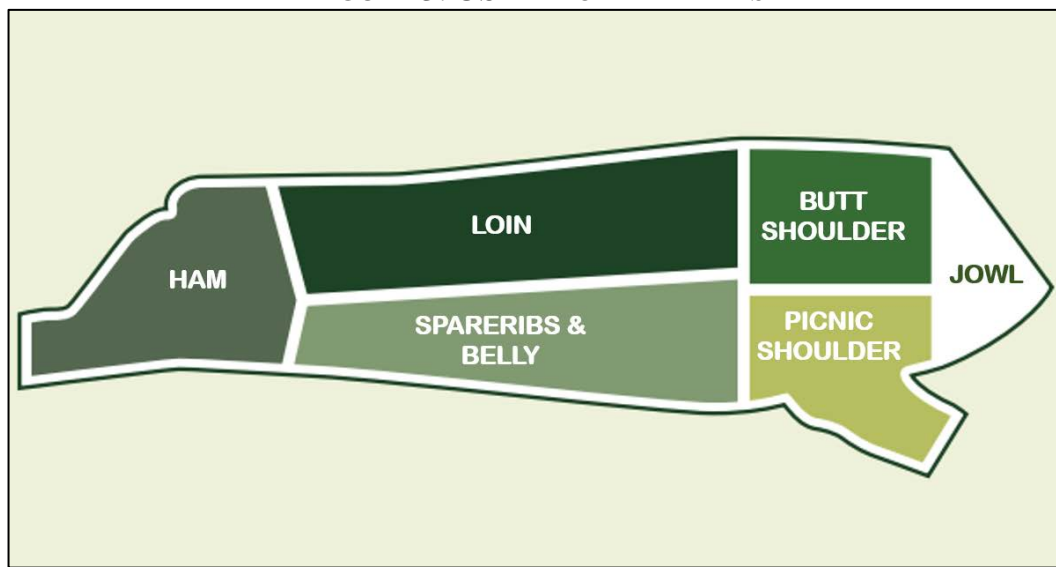
²⁶ *Id.* at 59. *See also* Economic Research Service, *Hogs & Pork: Sector at a Glance*, U.S. DEPARTMENT OF AGRICULTURE (accessed March 2022), available at <https://www.ers.usda.gov/topics/animal-products/hogs-pork/sector-at-a-glance/>.

²⁷ *See* Table 9.

²⁸ *See A User’s Guide to USDA’s LMR Pork Reports*, U.S. DEPARTMENT OF AGRICULTURE (accessed March 2022), available at <https://www.ams.usda.gov/sites/default/files/media/LMRPorkPriceReportsHandout.pdf>. *See also A User’s Guide to USDA’s Pork Carcass Cutout*, U.S. DEPARTMENT OF AGRICULTURE (January 2022), available at <https://www.ams.usda.gov/sites/default/files/media/LMRPorkCutoutHandout.pdf>.

²⁹ *Id.*

FIGURE 3: USDA PORK PRIMALS



Source: <https://www.ams.usda.gov/sites/default/files/media/LMRPorkPriceReportsHandout.pdf>

29. In the third step, meat leaves the processing plant and makes its way to the end consumer. I understand that the firm that first purchases the pork product from the processor is termed the “Direct Purchaser,” while the final consumer of the product is termed the “Indirect Purchaser.”³⁰ The Indirect Purchaser consumes the product either as a grocery product (the consumer prepares the pork themselves) or as a foodservice item (the pork is prepared for them as a part of a service). Many processors sell directly to large retail grocers like Walmart (the Direct Purchaser), which in turn puts the product on their shelves and sells to end consumers (the Indirect Purchasers). Other products are sold to large wholesalers,

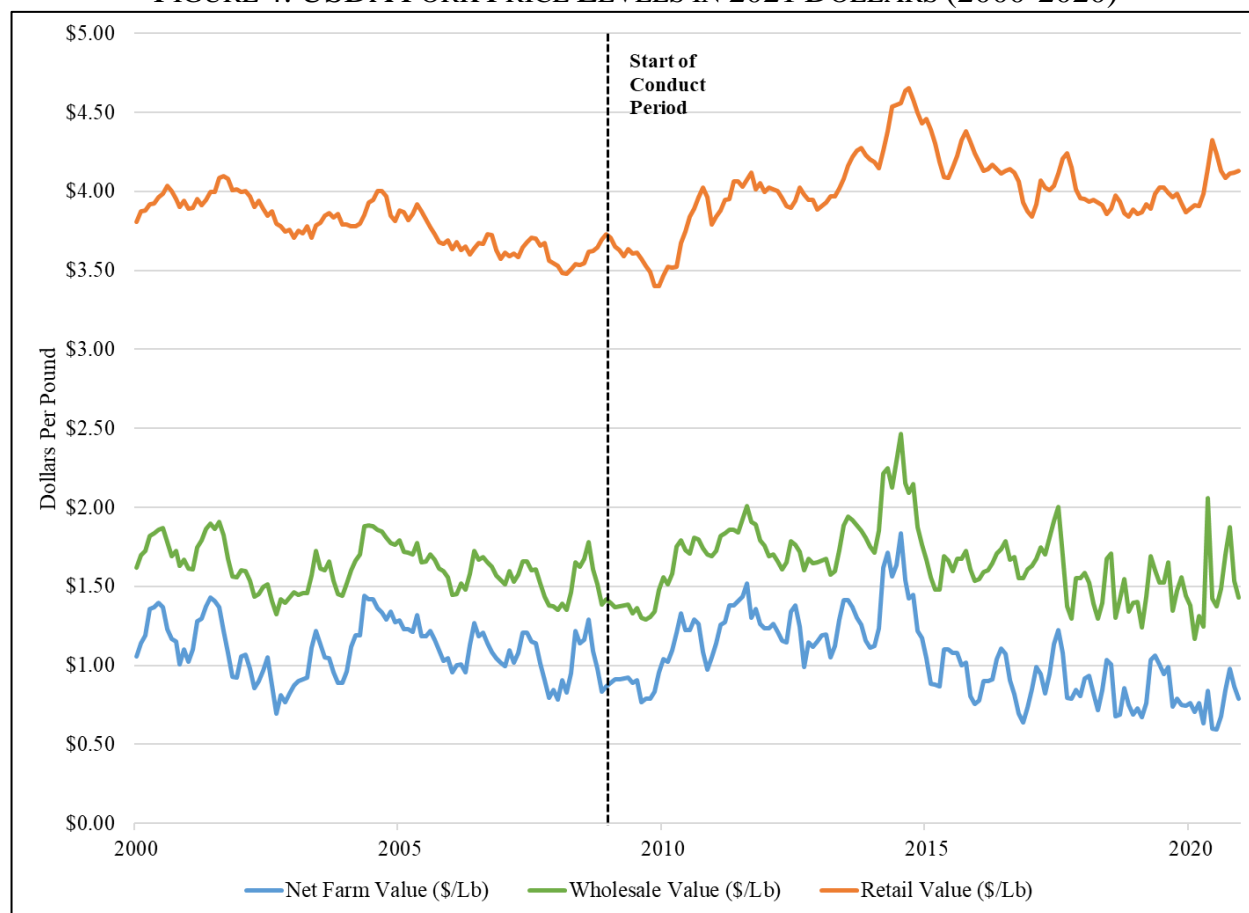
³⁰ See, e.g., William Landes & Richard Posner, *Should Indirect Purchasers Have Standing To Sue Under the Antitrust Laws? An Economic Analysis of the Rule of Illinois Brick*, UNIVERSITY OF CHICAGO LAW REVIEW 602-635 (1979), available at https://chicagounbound.uchicago.edu/cgi/viewcontent.cgi?article=2549&context=journal_articles.

which themselves may sell to a smaller distributor, before the product reaches the shelf of a retail store. At each stage in the chain, the reseller marks up the price of the product.³¹

30. Real retail pork prices have increased during the Conduct Period. Figure 4 below shows the average inflation-adjusted value of all pork (in dollars per pound) at each stage of the supply chain: The value when the product leaves the farm (Net Farm Value), the value when it leaves the processing plant (Wholesale Value), and the final price the consumer pays (Retail Value). There was a notable increase in consumer prices beginning around 2009. Inflation-adjusted retail prices were \$3.79 per pound between 2000-2008, and \$4.01 between 2009-2020, a six percent increase. Over the same period, farmer values dropped by 5.5 percent and processor (wholesale) values increased by two percent.

³¹ See, e.g., *Wholesale and retail Producer Price Indexes: margin prices*, BUREAU OF LABOR STATISTICS (August 2012), available at https://www.bls.gov/opub/btn/volume-1/wholesale-and-retail-producer-price-indexes-margin-prices.htm?view_full.

FIGURE 4: USDA PORK PRICE LEVELS IN 2021 DOLLARS (2000-2020)



Source: United States Department of Agriculture “Meat Price Spreads”, available at <https://www.ers.usda.gov/data-products/meat-price-spreads/>. CPI data from <https://fred.stlouisfed.org>.

Notes: See William Hahn, “Beef and Pork Values and Spreads Explained” for the USDA methodology, available at https://www.ers.usda.gov/webdocs/outlooks/37369/49585_ldpm11801.pdf?v=9749.1

31. Relatedly, pork processors have captured more value in the supply chain during the Conduct Period. Figure 5 shows this same data as a price spread for the pork processors. The spread is the difference in prices between each step in the supply chain, which helps illustrate the value capture at each stage. The Farm-Wholesale Spread is the price increase that occurs at the processor stage; that is, the difference between what the

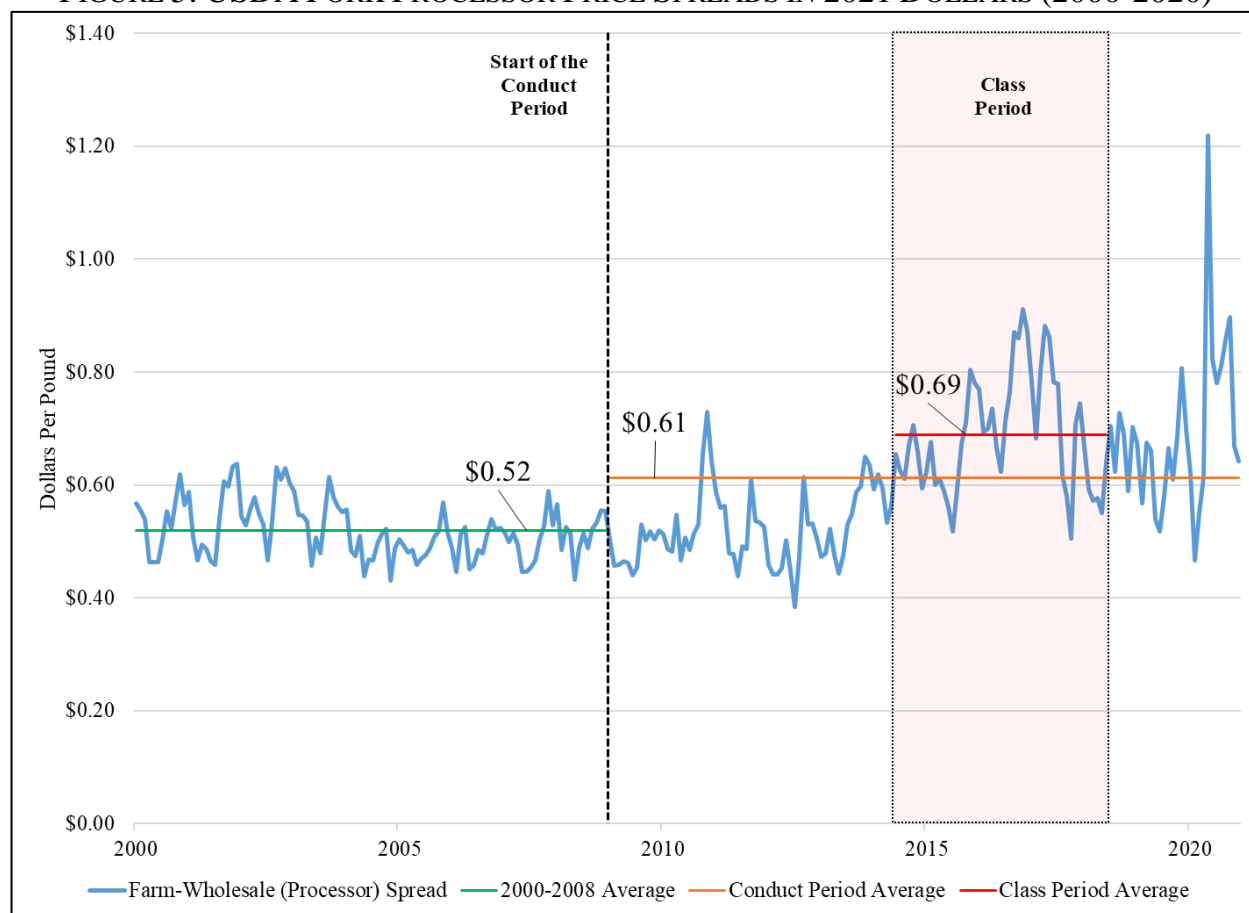
farmer receives and what the processors captures in the sale.³² Relevant to the present matter, the average price spread in 2021 dollars for pork processors increased by *17.3 percent* during the Conduct and After Period (2009-2020),³³ or *over 32 percent* during the Class Period (June 2014-July 2018)³⁴ relative to the average 2000-2008 spread.

³² The USDA is careful to note that a price spread is not a gross margin calculation but notes that they are likely to be highly correlated, (“The price spread may be higher or lower than packers’ total gross margins; still, ERS price spreads and packer gross margins are likely to be highly correlated.”). William Hahn, “Beef and Pork Values and Spreads Explained” , [hereafter Hahn (2004)] for the USDA methodology, *available at* <https://www.ers.usda.gov/webdocs/outlooks/37369/49585ldpm11801.pdf?v=9749.1>.

³³ Equal to $(0.61 - 0.52)/0.52 = 0.7318$.

³⁴ Equal to $(0.69 - 0.52)/0.52 = 0.327$.

FIGURE 5: USDA PORK PROCESSOR PRICE SPREADS IN 2021 DOLLARS (2000-2020)



Source: United States Department of Agriculture “Meat Price Spreads”, available at <https://www.ers.usda.gov/data-products/meat-price-spreads/>. CPI data from <https://fred.stlouisfed.org>.

Notes: See “Beef and Pork Values and Spreads Explained” for the USDA methodology, available at https://www.ers.usda.gov/webdocs/outlooks/37369/49585_ldpm11801.pdf?v=9749.1

B. Defendants

32. Defendants in this case are seven major pork processing companies who collectively represent 80.4 percent of hog slaughtering and processing capacity in the United States.³⁵

³⁵ See Table 3.

- Smithfield³⁶ is based out of Smithfield, Virginia³⁷ and is a wholly owned subsidiary of the Chinese firm WH Group.³⁸ Smithfield was founded in 1936 and is the largest U.S. processor at 25 percent of U.S. hogs.
- JBS USA³⁹ is based out of Greeley, Colorado⁴⁰ and is a wholly owned subsidiary of the Brazilian firm JBS S.A..⁴¹ JBS USA owns and operates Swift & Company, which it acquired in 2007. JBS processes 18 percent of U.S. hogs. It acquired Cargill's U.S. based pork business in 2015.⁴²
- Tyson⁴³ is a publicly traded U.S. company based out of Springdale, Arkansas.⁴⁴ Founded in 1935, Tyson processes 16 percent of U.S. hogs.
- Clemens⁴⁵ is a privately owned company based out of Hatfield, PA.⁴⁶ Founded in 1895, Clemens processes 5 percent of U.S. hogs.
- Seaboard⁴⁷ is based out of Guymon, OK and is a wholly owned subsidiary of the publicly traded U.S. company Seaboard Corporation.⁴⁸ Founded in 1990, Seaboard processes 6 percent of U.S. hogs. Seaboard jointly owns and operates one processing plant with Triumph in Sioux City, Iowa.
- Triumph⁴⁹ is a privately owned company based out of St. Joseph, MO.⁵⁰ Founded in 2003 by a group of independent U.S. pork producers,⁵¹ Triumph processes 6 percent of U.S. hogs. Triumph jointly owns and operates one processing plant with Seaboard in Sioux City, Iowa.

³⁶ Specifically, Smithfield Foods, Inc.

³⁷ Smithfield, *About Us*, available at <https://www.smithfieldfoods.com/About-Us>.

³⁸ Smithfield Form 10-K.

³⁹ Specifically, JBS USA Food Company.

⁴⁰ JBS Foods USA, available at <https://jbsfoodsgroup.com/businesses/jbs-foods-usa>.

⁴¹ JBS USA Form 10-K.

⁴² *JBS USA Pork Agrees To Purchase Cargill Pork Business*, PR NEWswire (July 1, 2015), available at <https://www.prnewswire.com/news-releases/jbs-usa-pork-agrees-to-purchase-cargill-pork-business-300107828.html>.

⁴³ "Tyson" refers to Tyson Foods, Inc., Tyson Fresh Meats, Inc. and Tyson Prepared Foods, Inc.

⁴⁴ Tyson Foods, Inc Form 10-K.

⁴⁵ "Clemens" refers to Clemens Food Group, LLC, the Clemens Family Corporation, and Hatfield Quality Meats collectively.

⁴⁶ Clemens Foods Group, *Our Company*, available at <https://www.clemensfoodgroup.com/our-company>.

⁴⁷ Specifically, Seaboard Foods LLC. Seaboard operates a joint processing plant with Triumph.

⁴⁸ Seaboard Foods, *Our History: A Legacy of Quality and Innovation*, available at <https://www.seaboardfoods.com/our-history/> ; Seaboard Foods, *Contact Us*, available at <https://seaboardfoods.com/contact-us>.

⁴⁹ Specifically Triumph Foods, LLC.

⁵⁰ Triumph Foods, *Contact Us*, available at <https://www.triumphfoods.com/contact/>.

⁵¹ Triumph Foods, *Triumph' Story*, available at <https://www.triumphfoods.com/triumphs-story/>.

- Hormel⁵² is a publicly traded U.S. company based out of Austin, MN.⁵³ Founded in 1891, Hormel processes 4 percent of U.S. hogs.

C. Agri Stats

33. Agri Stats is a data processing firm that collects agricultural data from its members and provides them with statistical benchmarks on how they perform relative to the rest of the industry. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Agri Stats claims these reports allow participating members to identify [REDACTED]

[REDACTED] and to compare [REDACTED]

[REDACTED] 58 [REDACTED]

[REDACTED] 59 Appendix

Table 1 shows when each of the defendants joined Agri Stats and which reports they received

⁵² Specifically, Hormel Foods Corporation.

⁵³ Hormel Foods, *Our History*, available at <https://www.hormelfoods.com/about/our-history/>.

⁵⁴ AGSTAT-P-0000000459 at -4.

⁵⁵ *Id.* at -6.

⁵⁶ AGSTAT-P-0000019809.

⁵⁷ AGSTAT-P-0002614319 at -11. Note that in 2006, Agri Stats acquired rival firm Agrimetrix who was providing “Plant” and “Sales” reports to some defendant pork processors prior to the class period. Starting in 2009, Agrimetrix invoices were merged with Agri Stats and the individual defendant tabs include retroactive data on Agrimetrix subscriptions. *See* AGSTAT-P-0003457366.

⁵⁸ AGSTAT-P-0002614319 at -8.

⁵⁹ AGSTAT-P-0003439373 at -6. *See also* Deposition of Stacey Edwards (Jan. 25, 2022) [hereafter, Edwards Dep.] at 33:21-23, [REDACTED]

according to Agri Stats fee records. All Defendants received the Agri Stats “Sales” reports during the Class Period.

34. [REDACTED]

Once the data is tabulated Agri Stats distributes each member’s cost, price, and sales data to the participating members industry members.

D. Price-Fixing Conspiracies

35. Collusion occurs when a group of sellers coordinate their economic behavior to collectively approximate (or even replicate) the same pricing and associated profits of a monopolist.⁶³ Economists have long recognized that monopolists enjoy greater profits than

⁶⁰ AGSTAT-P-0003439373 at -22-26.

⁶¹ *Id.*

⁶² *Id.* See also, Edwards Dep. at 147:12 to 147:24

id. at 154:16-21,

⁶³ See DENNIS CARLTON & JEFFREY PERLOFF, MODERN INDUSTRIAL ORGANIZATION 122-154 (Pearson 2005 4th ed.) [hereafter MODERN IO].

firms in competitive industries.⁶⁴ A monopolist firm restricts output relative to what would be produced in competition, increasing its own profits at the expense of consumer welfare. Such a position is desirable for a firm, but difficult to obtain since antitrust law prevents simply acquiring all other industry rivals.⁶⁵ However, if the firms in an industry reach an agreement to artificially inflate prices or restrain supply, they can reach the same monopoly profits as if they functioned like a monopolist.⁶⁶ This is commonly achieved by an agreement to inflate prices, reduce quantity, reduce quality, or decrease some other consumer benefit relative to what would occur in a competitive environment.⁶⁷ Such an agreement is termed “collusion,” and the group of firms with such an agreement is called a “cartel.”⁶⁸ In this case, Plaintiffs allege that the Defendants shared competitively sensitive information with one another which allowed them to reduce output and inflate prices.

36. Economists also recognize that the exchange of competitively sensitive information on price, quantity, capacity, costs, or other competitive information among horizontal competitors can effectuate collusive outcomes.⁶⁹ Because individual firms in a cartel have an incentive to “cheat” by selling more of their own goods at the higher monopoly price, cartel members must have a means to monitor each other’s production behaviors

⁶⁴ N. GREGORY MANKIW, PRINCIPLES OF MICROECONOMICS 293-303 (8th ed. 2018) [hereafter MANKIW].

⁶⁵ Robert C. Marshall and Leslie M. Marx, THE ECONOMICS OF COLLUSION, CARTELS AND BIDDING RINGS 8 (The MIT Press 2012) [hereafter ECONOMICS OF COLLUSION].

⁶⁶ *Id.* at 7.

⁶⁷ *Id.* at 85.

⁶⁸ MANKIW at 339.

⁶⁹ See Part III below.

through information exchanges.⁷⁰ Although information exchanges sometimes take the form of explicit price-fixing—with participating firms sharing with each other the prices they will charge, so that each can be assured that its competitors will keep prices above competitive levels—the exchange of sufficiently disaggregated competitively sensitive information can and does help to effectuate collusive outcomes.⁷¹ In each case, the end result is the same: customers pay artificially inflated prices, relative to what would have prevailed under competition.

E. Economics of Defendants’ Alleged Price Fixing Conspiracy

37. Economic theory shows that market demand curves are downward sloping.⁷² In a competitive market, the demand curve facing each individual firm is essentially horizontal: a small firm can sell as much quantity as it wants at the market price, as the firm’s individual production decisions do not materially move the wider market.⁷³ A decision by an individual firm to underproduce in a competitive market is met by their rivals filling the production gap. In contrast, the demand curve facing a monopolist, or any firm with pricing power, is downward sloping.⁷⁴ A monopolist seller (or a cartel behaving as a monopolist) can artificially raise prices by restricting the amount of product in the market without fear that a competitor would fill the production gap.⁷⁵ Monopolists choose a level of output where

⁷⁰ ECONOMICS OF COLLUSION at 7.

⁷¹ *Id.*; see also Part III below.

⁷² See, e.g., MANKIW at 67-69.

⁷³ *Id.* at 268-284, 294.

⁷⁴ *Id.* at 294.

⁷⁵ *Id.* at 293.

the marginal revenue associated with the last unit produced is equal to the marginal cost, which results in an inflated market price relative to competition.⁷⁶

38. Practically speaking, producers who find themselves in a monopoly position or with pricing power can reduce output from competitive levels in a variety of ways, such as (A) closing production facilities, (B) running facilities below their maximum capacity (either by reducing input purchases or by fiat), (C) ceasing further expansion plans in the face of growing demand, or (D) finding other uses for the product that keeps it off the primary market. In this case, the evidence suggests that Defendants artificially lowered the supply of Class Pork Products available to Class Members through a combination of methods.

39. In Part VIII.C.1.a, I review the evidence that Defendants ran their plants below capacity by liquidating overall pig herds (by reducing the number of female breeders). I also review evidence that Defendants ran their plants below production capacity by decreasing the number of processing plant hours, or by suspending plant operations on certain days. Reducing the number of inputs into a process, or limiting production time, both have the expected effect of reducing output, which raises prices.

40. The evidence also suggests that Defendants artificially reduced domestic supply by exporting more pork to foreign markets than they would have in a competitive world. In other words, Defendants reduced domestic supply and increased domestic prices—just as economic theory predicts a monopolist would do—by shipping more pork into foreign markets than they would have under competitive conditions. A monopolist's or a cartel's

⁷⁶ *Id.* at 297. The exception is if demand is perfectly elastic.

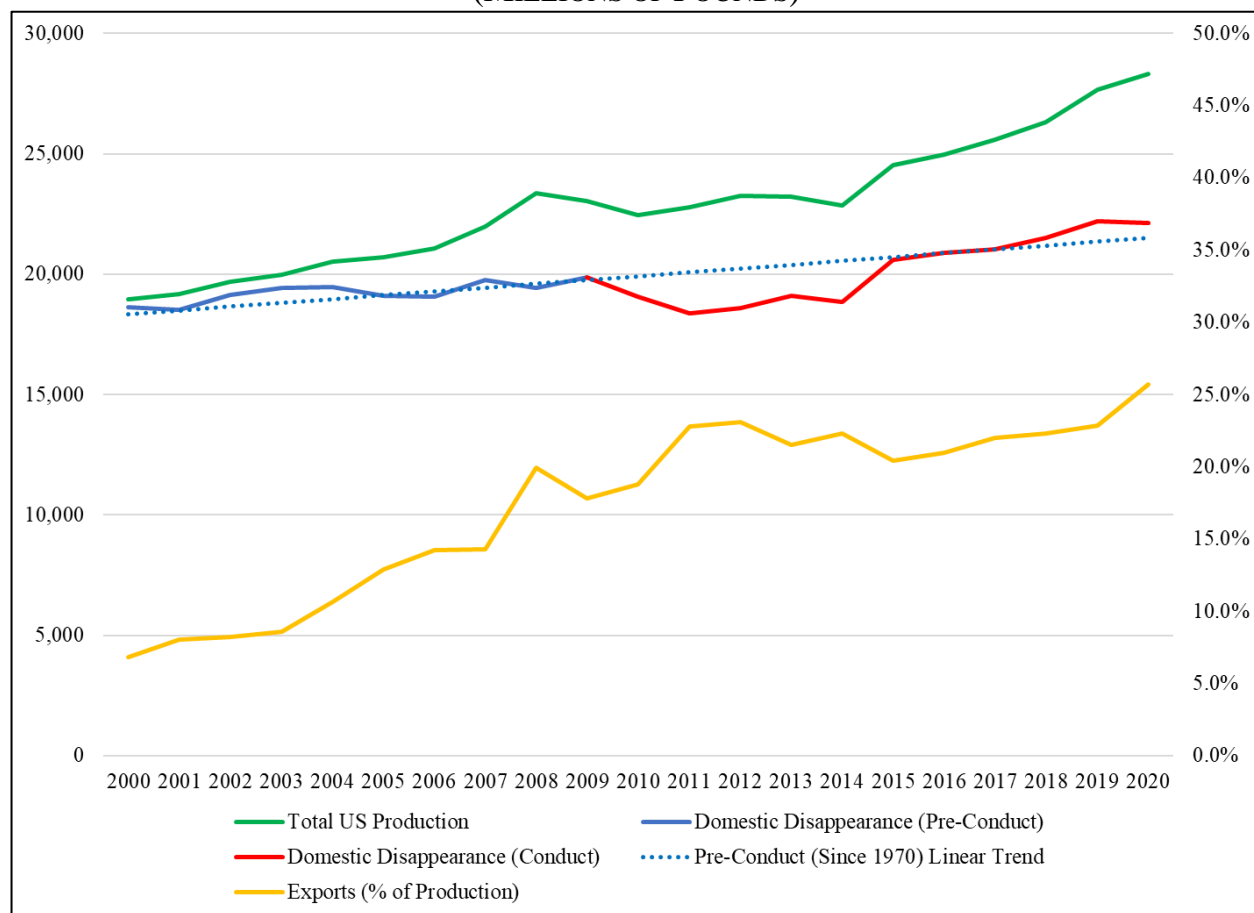
decision to export product may be preferable to reducing total production via plant closures or utilization cuts, because the decision whether to export or sell domestically can be made at the last step in the supply chain, and it does not require the producer to tamper with the long lead time of raising hogs.⁷⁷ An export strategy would also be far more difficult for regulators to detect, as opposed to the (more obvious) wholesale closure of processing facilities.

41. Aggregated national data from the USDA show that U.S. domestic pork “disappearance,” or the amount of pork available for consumption in the domestic market, deviated from its historical trend during the Conduct Period, while domestic production flatlined and exports surged.⁷⁸ Figure 6 shows that the difference between the pre-2009 trendline of domestic pork availability (going back to the beginning of the data in 1970) and the actual amount of domestic pork available during the Conduct Period is over 5,000 million pounds of pork, or about a quarter-years’ worth of U.S. total pork processing output.

⁷⁷ See Part I.A. See also Figure 7, a Tyson document showing [REDACTED]

⁷⁸ See the formal definition of “disappearance” in Section III.B.1.

FIGURE 6: U.S. PORK PRODUCTION, EXPORTS, AND DOMESTIC DISAPPEARANCE
(MILLIONS OF POUNDS)



Source: USDA Livestock and Meat Domestic Data, Meat Supply and Disappearance Tables.
<https://www.ers.usda.gov/data-products/livestock-and-meat-domestic-data/>

42. The evidence indicates starting around 2009, Defendant Processors and Agri Stats made exporting pork to *keep it out of the U.S. market* a deliberate strategy. As one Smithfield executive put it: [REDACTED]

[REDACTED]⁷⁹ One industry analyst memo notes: [REDACTED]

⁷⁹ SMITHFIELD01071523 at -538-539, a response from COO Kenneth M. Sullivan during a Smithfield 2015 3rd Quarter Results Presentation.

[REDACTED]⁸⁰ Chris Hurt, an economist affiliated with Purdue University, wrote in a 2011 that:

[REDACTED]

43. A firm's decision to export is not itself evidence of a conspiracy. A firm's individual decision to sell into foreign markets could be perfectly rational in a competitive environment. However, such an action becomes suspicious when it is against the firm's unilateral self-interest; such as selling at prices below cost, or at prices in foreign markets *below* what could be achieved in the domestic market. As I explain in Part VIII C.1, the reason a firm would unprofitably shift product into a foreign market, leading to a product shortfall in the domestic market, is if that firm believes that its rivals will follow suit, or at least not (competitively) expand production to fill the newly created domestic shortfall.⁸²

⁸⁰ SBF0294998 at -5007, a 12/29/2011 December Hog and Pork Update from Informa Economics.

⁸¹ JBS-PORK-00274612, a January 2011 email to Jeff Greene of JBS sent from CAM foods (emphasis added).

⁸² Actions to increase price or reduce output (in the face of prices above marginal costs) that are not easily reversible are sometimes referred to as "perilous leading," since the firm which "leads" the production drop or price increase is betting that other firms will follow suit. *See* Phillip Areeda and Herbert Hovenkamp, *Fundamentals of Antitrust Law* § ¶ 1425d1 (1978), ("the peril [of leading] will be great when following is doubtful *and* reversal is costly."). *See also Kleen Prods. LLC v. Ga.-Pacific LLC*, 910 F.3d 927 (7th Cir. 2018) at 937 ("Firms take significant risks by reducing their output in an inflexible manner, unless there is an enforceable agreement in place to ensure that competitors will follow suit.") and 938 ("Because perilous leading makes 'little economic sense' absent coordination, evidence of less-reversible supply restrictions supports an inference of conspiracy.").

Because of the risk taken on by the leading firm, such actions rarely make sense as rational economic conduct in the absence of collusion.⁸³

44. For example, in a 2015 email exchange between Smithfield's Scott Saunders (VP of the U.S. supply chain) and Dhamu Thamodaran (Executive Vice President & Chief Commodity Hedging Officer) about managing pork output, Mr. Thamodaran explains that Smithfield was intentionally exporting pork at a loss (or at least at cost) to inflate domestic prices:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

A 2012 internal strategy email sent by Mr. Thamodaran (discussing the USDA's Pork Cut-Out price, an industry wide price index) stressed that [REDACTED]

[REDACTED]⁸⁵ And a 2010 internal Smithfield Market Outlook memo

⁸³ ABA PROOF OF CONSPIRACY at 70.

⁸⁴ SMITHFIELD00872455 (sic).

⁸⁵ SMITHFIELD00828433, a 2012 email between Dhamu Thamodaran and Larry Pope.

[REDACTED]

[REDACTED]⁸⁶

45. It is also worth noting that when discussing exports, Defendants often refer to the prices and profitability of the *pork processing industry as a whole*, as opposed to prices and profitability of their own firm. A 2009 email from Noel White, at the time a Vice President of Tyson's Fresh Meats division and eventually the CEO of Tyson, states that [REDACTED]

[REDACTED]

[REDACTED]⁸⁷ Another 2013 email with notes from a meeting state that Tyson's plan is to increase exports to Japan, noting that [REDACTED]

[REDACTED]⁸⁸ Tyson executives also write that exports outpaced overall capacity expansion, leading to a net decrease in total U.S. domestic disappearance.⁸⁹ A 2012 Seaboard Weekly update notes that [REDACTED]

[REDACTED]⁹⁰

Similarly, a 2016 Seaboard/Triumph email from the CFO [REDACTED]

[REDACTED]⁹¹ I have not seen any evidence of Defendants

⁸⁶ SMITHFIELD01055882, a 2010 Smithfield Trading Office Market Outlook Memo [REDACTED]

⁸⁷ TF-P-000518663, a 20019 email from Noel White to Ruth Ann Wisener (emphasis added).

⁸⁸ TF-P-000021759, a 2013 memo from Roel Andriessen, Tyson's SVP of international Sales.

⁸⁹ TF-P-001381827, a 2016 email from Jason Brestor, Tyson's VP of pork procurement, notes that over the [REDACTED]

⁹⁰ SBF0069222 at -225, a 7/13/12 SBF Weekly Update Week 27 from Terry Holton to Steve Bresky.

⁹¹ TRI0000005773, a 7/11/2016 email from Triumph's CFO McClain Southwell to Seaboard and Triumph executives.

expanding domestic availability in response to their rival's cuts. I expand on this export evidence in Part VIII.C.1(3).

II. DEFENDANTS COLLECTIVELY WIELD MARKET POWER

46. Defendants can be shown to wield market power in two ways: (1) via an indirect proof and (2) via a direct proof. Beginning with the indirect proof, the Department of Justice and Federal Trade Commission (the “antitrust agencies”) consider a product to be an antitrust market if a hypothetical entity controlling that product could exercise market power. This is done by establishing that 1) pork is a relevant antitrust market, 2) that Defendants collectively have significant shares of pork production, and 3) that they are protected by barriers to entry. If those three conditions are met, it implies that Defendants wield market power and thus could profitably raise prices on pork products above competitive levels if they behaved like a monopolist.⁹²

47. This market definition exercise provides *indirect* evidence of market power. If there is *direct* evidence of Defendants’ market power, it is not economically necessary to demonstrate market power indirectly by defining a relevant product market.⁹³ This is the

⁹² U.S. Department of Justice and Federal Trade Commission, *Horizontal Merger Guidelines* (2010) §1 [hereafter *Merger Guidelines*].

⁹³ See, e.g., Carl Shapiro, *Antitrust: What Went Wrong and How to Fix It*, 35(3) ANTITRUST 33-45, 40 (Summer 2021) (“IO economists know that the actual economic effects of a practice do not turn on where one draws market boundaries. I have been involved in many antitrust cases where a great deal of time was spent debating arcane details of market definition, distracting from the real economic issues in the case. I shudder to think about how much brain damage among antitrust

case here. As I show in Section II.B., Defendants were able to artificially inflate pork prices over competitive levels by 12.8 on average during the Conduct Period. Nonetheless, for completeness I demonstrate using the indirect proof that Defendant's collectively wield market power.

A. Indirect Proof of Defendants' Collective Market Power

48. In this section I show that pork in the United States is a relevant antitrust market. I explain how economists and antitrust agencies define the contours of a relevant antitrust market, and then demonstrate that pork fits these criteria using a standard SSNIP test. I then discuss the qualitative factors of the pork industry that support this definition of pork as the relevant antitrust market in this case.

lawyers and economists has been caused by arguing over market definition.”). Dr. Shapiro has twice held the position of Deputy Assistant Attorney General for Economics at the Antitrust Division of the U.S. Department of Justice. *See also* Herbert Hovenkamp, *Digital Cluster Markets*, COL. BUS. L. REV. (forthcoming 2021) (“[D]igital markets are particularly susceptible to direct measurements of market power that do not depend on a market definition.”); Louis Kaplow, *Why (Ever) Define Markets?*, 124 HARV. L. REV. 437 (2010); Jonathan Baker & Timothy Bresnahan, *Economic Evidence in Antitrust: Defining Markets and Measuring Market Power* in PAOLO BUCCIROSSI, ED., HANDBOOK OF ANTITRUST ECONOMICS 1- 42 (MIT Press 2008) [hereafter Baker & Bresnahan], at 15. *See also* Aaron S. Edlin & Daniel L. Rubinfeld, *Exclusive or Efficient Pricing? The Big Deal Bundling of Academic Journals*, 72 ANTITRUST L.J. 119-158, 141 (2004) (“Market definition is only a traditional means to the end of determining whether power over price exists. Power over price is what matters...if power can be shown directly, there is no need for market definition: the value of market definition is in cases where power cannot be shown directly and must be inferred from sufficiently high market share in a relevant market.”). *See also* PHILLIP E. AREEDA, EINER ELHAUGE & HERBERT HOVENKAMP, 10 ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION 267, 325–28, ¶ 1758b. (1996 & Supp. 2003); *see also* PHILLIP AREEDA, LOUIS KAPLOW & AARON EDLIN, ANTITRUST ANALYSIS: PROBLEMS, TEXT AND CASES ¶ 344 (6th ed. 2004). *See also* *Merger Guidelines*, §4 (“[e]vidence of competitive effects can inform market definition[.]”).

1. Product Market Definition

49. The market definition exercise examines “a customers’ ability and willingness to substitute away from one product to another in response to a price increase” by a hypothetical monopolist.⁹⁴ The DOJ’s and FTC’s *Horizontal Merger Guidelines* define a relevant antitrust product market as a product or group of products that, if controlled by said monopolist, could sustain a Small but Significant and Non-transitory Increase in Price (the “SSNIP”) over the competitive level.⁹⁵ The SSNIP is usually assessed as a five percent increase in price over competitive levels.⁹⁶ Stated differently, if a seller is able to permanently raise prices of a product by five percent over the competitive level without decreasing profitability, that product constitutes its own relevant antitrust market. Not all products constitute their own relevant antitrust market. If a sufficient number of customers view products outside the proposed product market as adequately interchangeable with products within the proposed market, a hypothetical monopolist could not profitably raise prices because the loss of consumers switching to the outside good would exceed the increased profits gained from the higher price paid by the remaining consumers. If the SSNIP test indicates this would not be profitable, the economist would then assess a broader

⁹⁴ *Merger Guidelines* §4.

⁹⁵ *Id.* §4.1.1.

⁹⁶ *Id.* §4.1.2 (“The Agencies most often use a SSNIP of five percent of the price paid by customers for the products or services to which the merging firms contribute value. However, what constitutes a “small but significant” increase in price, commensurate with a significant loss of competition caused by the merger, depends upon the nature of the industry and the merging firms’ positions in it, and the Agencies may accordingly use a price increase that is larger or smaller than five percent.”).

definition, repeating the analysis by adding in additional alternative products until the SSNIP test was satisfied.⁹⁷

50. It is important to note that if a hypothetical monopolist wields market power in a broadly defined relevant antitrust market, then it follows that they also wield market power for all of the individual products and potential sub-markets within the broader market definition. For example, if Defendants have market power over pork generally, it implies that they also have market power over each specific cut of pork such as loins or ribs.⁹⁸ Given that the scope of the Challenged Conduct in this case applied to all pork processing, it makes no economic sense to consider a relevant market for individual parts of a pig. Because virtually all parts of a pig are harvested in processing, a hypothetical monopolist could not reduce the supply of say, pork loin, without also reducing the supply of bacon.⁹⁹ I therefore posit that the relevant antitrust market is pork, which subsumes all Class Pork Products.

2. Geographic Market Definition

51. I posit that the relevant geographical market is the United States. The domestic pork processors face little competition from foreign pork imports.¹⁰⁰ Pork imports into the United States are not significant: Pork imports account for only three percent of domestic

⁹⁷ *Id.* §4.1.1.

⁹⁸ *Id.* §4.1.1. (“The hypothetical monopolist test ensures that markets are not defined too narrowly, but it does not lead to a single relevant market. The Agencies may evaluate a merger in any relevant market satisfying the test, guided by the overarching principle that the purpose of defining the market and measuring market shares is to illuminate the evaluation of competitive effects.”).

⁹⁹ Short of destroying one product entirely.

¹⁰⁰ The decision in *Kleen Products (Kleen Products LLC v. International Paper Company)*, 831 F.3d 919, 924 (7th Cir. 2016)) determines that lack of competition from foreign imports in an industry is an important determinant of cartel success.

production, and the United States exports seven times the amount of pork it imports.¹⁰¹ With such a low market share, competition from foreign producers is unlikely to defeat a SSNIP among U.S. producers. For example, a 2011 Tyson presentation stated [REDACTED]

[REDACTED]¹⁰² In response to signing of the Trans-Pacific Partnership, a CME Group Daily Livestock Report noted [REDACTED]

[REDACTED]¹⁰³ The USDA writes that the United States is a “net exporter of pork” and “has been one of the world’s top five annual pork exporters” since 2000.¹⁰⁴ Given its strong pork exports, “[t]he United States has accounted for a diminishing share of world pork imports, as U.S. import volumes have fallen, and world trade has expanded.” Data from the Conduct Period show that shows that pork imports account for less than five percent of domestic supply.¹⁰⁵

¹⁰¹ In 2020, the United States produced 28.314 billion pounds of pork, exported 7.28, and imported 0.904. Imports divided by total production is 0.032. M. Shahbandeh, *U.S. Total Pork Production 2000-2020*, STATISTA (Jan. 28, 2022), <https://www.statista.com/statistics/194696/us-total-pork-production-since-2000/>; M. Shahbandeh, *U.S. Total Pork Imports and Exports 2006-2022*, STATISTA (Feb. 8, 2022), <https://www.statista.com/statistics/194708/us-total-pork-imports-and-exports-since-2001/>.

¹⁰² A November 2011 Tyson presentation on [REDACTED] focused on production and exports as the most important factors determining US supply. Imports are mentioned in a footnote stating: [REDACTED] with the bullet [REDACTED] TF-P-000641160 at slide 16.

¹⁰³ HFC-PORKAT0000020124.

¹⁰⁴ Economic Research Service, *Hogs & Pork: Sector at a Glance*, U.S. DEPARTMENT OF AGRICULTURE (accessed March 2022), available at <https://www.ers.usda.gov/topics/animal-products/hogs-pork/sector-at-a-glance/>.

¹⁰⁵ U.S. imports account for 4.7 percent of Total Domestic Disappearance from 2009 to 2020. See my workpapers for details.

3. A SSNIP Test Indicates that Pork Is a Relevant Antitrust Market

52. The DOJ's and FTC's Horizontal Merger Guidelines define a relevant antitrust product market by performing a "Hypothetical Monopolist Test."¹⁰⁶ The test seeks to understand customers' ability to substitute away from one product to another in response to a price increase. To perform the test, the economist selects a product or group of products as a proposed market. The economist then simulates what would happen if a "hypothetical monopolist" became the only present and future seller of those products. If the hypothetical monopolist could profitably impose a Small but Significant and Non-transitory Increase in Price (a "SSNIP") over the competitive price level for that group of products, the DOJ and FTC declare those products a relative antitrust market.¹⁰⁷ The SSNIP is normally taken to be a five percent price increase.¹⁰⁸ If the SSNIP cannot be executed profitably, it implies that there are enough customers who view products outside the proposed market as adequately substitutable with products within the proposed market; in this case, the loss of some consumers switching to outside products (the "marginal" customers) would exceed the gain from the higher price paid by the remaining consumers (the "inframarginal" customers).

53. Economists may use a hypothetical monopolist test prospectively, such as in merger cases where the test is used to analyze whether a newly merged firm could raise

¹⁰⁶ *Merger Guidelines* §4.1.

¹⁰⁷ *Id.* §4.1.1.

¹⁰⁸ *Id.* §4.1.2 ("The Agencies most often use a SSNIP of five percent of the price paid by customers for the products or services to which the merging firms contribute value. However, what constitutes a "small but significant" increase in price, commensurate with a significant loss of competition caused by the merger, depends upon the nature of the industry and the merging firms' positions in it, and the Agencies may accordingly use a price increase that is larger or smaller than five percent.").

prices. The test can also be used retrospectively, including in cases where a not-so-hypothetical monopolist (or a group of firms behaving as a monopolist) already commands the markets in question.¹⁰⁹ Importantly, a retrospective hypothetical monopolist test has the potential to underestimate a hypothetical monopolist's market power, because the prices and margins in the actual world may be partially contaminated by the Challenged Conduct and distant substitutes appear closer in product space when prices are already monopolized.¹¹⁰ If available, one appropriate solution is to use data from a period when the industry was either less concentrated or the Challenged Conduct was not present.

54. Below, I perform a version of the hypothetical monopolist test called a “critical elasticity analysis” to assess a whether SSNIP of five percent would be profitable for a hypothetical monopolist of pork products.¹¹¹ At a high level, a firm's gross profit is determined $P = m * q$, where P is profit, m is the margin (price minus the cost of the good) the firm earns on each unit sold, and q is the number of units sold. Holding everything else

¹⁰⁹ OECD Policy Roundtable, *Market Definition 2012*, ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (October 11, 2012) at 40, available at www.oecd.org/daf/competition/Marketdefinition2012.pdf <https://www.oecd.org/daf/competition/Marketdefinition2012.pdf> (“In monopolisation cases or in cases of an abuse of a dominant position, the potential anticompetitive effects may already have occurred. As a result, the analysis may be retrospective and the prevailing price may already be higher as compared to the but-for price.”).

¹¹⁰ *Id.* This is known as the “Cellophane Fallacy,” named after the US Supreme Court case in *United States v. E.I. du Pont de Nemour and Co.* Briefly, the court “fail[ed] to recognise that the prices on which the market definition was based were already tainted by the infringement. In other words, the market definition proceeded prospectively, as if in a merger case, not taking the (at least partial) retrospective effects of the alleged infringement into account.”

¹¹¹ Gregory J. Werden, *The 1982 Merger Guidelines and the Ascent of the Hypothetical Monopolist Paradigm*, 71 ANTITRUST L.J. 253 (2003), available at <https://www.justice.gov/archives/atr/1982-merger-guidelines-and-ascent-hypothetical-monopolist-paradigm>. See also Merger Guidelines §4.1.3. (“Critical loss analysis asks whether imposing at least a SSNIP on one or more products in a candidate market would raise or lower the hypothetical monopolist's profits.”).

equal, increasing a product's price increases a firm's profit margin m and profit P . However, raising prices also tends to reduce the number of units q that buyers are willing to purchase. The point at which this becomes unprofitable is determined by how sensitive consumers are to changes in price.

55. To calculate this sensitivity in percentage terms, economists calculate a product's "own-price elasticity of demand." This is the percentage decrease in quantity q demanded that results from an increase in the product's own price p :¹¹²

$$E_{own} = \frac{\% \Delta q}{\% \Delta p}$$

For example, a reduction in quantity demanded of 10 percent following a price increase of 5 percent would yield an own-price demand elasticity of $\frac{-10}{5} = -2$. Demand is considered "elastic" when the elasticity greater in magnitude than -1, meaning quantity changes disproportionately more relative to price, and "inelastic" when less in magnitude than -1, meaning quantity moves disproportionately less relative to price.¹¹³ Although a firm's total *revenue* always increases when raising prices on inelastic goods (and falls when raising prices on elastic goods), the change in total *profit* depends on the relative change of the goods' margin that occurs alongside the price increase.¹¹⁴ The critical elasticity analysis solves for this change in profit under a hypothetical monopolist.

¹¹² MANKIW at 90-91.

¹¹³ MANKIW at 93.

¹¹⁴ *Id.* at 95-97.

56. The critical elasticity analysis can be broken into three parts. *First*, an economist calculates the critical elasticity of demand, which is the maximum *theoretical* elasticity of demand before a five-percent price increase on a group of products becomes unprofitable.¹¹⁵ *Second*, an economist empirically determines the *actual* own-price elasticity of demand for the product.¹¹⁶ *Third*, an economist compares the critical elasticity and the actual elasticity. So long as the actual elasticity is below the critical elasticity in magnitude, the price increase would be profitable to the hypothetical monopolist. If the price decrease is profitable, it implies that the buyers do not have sufficient outside substitutable alternatives to defeat an exercise of market power by the monopolist, and thus that the products in question represent a relevant antitrust market. I perform each of these steps for a hypothetical monopolist of pork products below.

57. *First*, to calculate the critical elasticity of demand, an economist needs to know the competitive margin on the product, m , and the price increase, p , here tested at five percent.¹¹⁷ By applying the following formula, one arrives at the critical elasticity E_c :¹¹⁸

$$E_c = \frac{1}{(m + p)}$$

¹¹⁵ Daniel L. Rubinfeld, *Market Definition Notes*, University of California, Berkeley (April 2015), [hereafter, *Market Definition Notes*] available at <https://www.law.berkeley.edu/wp-content/uploads/2015/04/Market-Definition-Notes.pdf>.

¹¹⁶ *Id.* (“Note: The industry elasticity facing the hypothetical monopolist should be smaller in magnitude than the elasticity of demand facing the merged entity because the hypothetical monopolist will face less competition than an individual firm”).

¹¹⁷ In a product market, m is the percentage profit margin of the hypothetical monopolist = $(P - MC)/P$.

¹¹⁸ *Market Definition Notes*.

58. In this case, gross margin data is available for the Defendants during a more competitive period, prior to the start of the Challenged Conduct in 2009. Fortunately, the Agri Stats reports contain a pristine measure of gross margin [REDACTED]

[REDACTED]¹¹⁹ [REDACTED]

[REDACTED]¹²⁰ I treat these values as Cost of Goods Sold and Revenue, respectively, allowing me to precisely calculate the gross margin for each Defendant.¹²¹ Although Tyson and Hormel did not have pre-2009 data, I include their average gross margin for the first three months of data in the Conduct Period. As shown in Table 1 below, gross margin from Defendants prior to 2009

[REDACTED]¹²²

¹¹⁹ I explain the structure of these reports in Part III.B.2.

¹²⁰ AGSTAT-P-0002614731 at -824-825. Agri Stats defines [REDACTED]

¹²¹ Gross margin is calculated as $\frac{\text{Revenue} - \text{COGS}}{\text{Revenue}}$. See, e.g., *Gross Profit Margin*, INVESTOPEDIA (updated Mar. 19, 2021), available at https://www.investopedia.com/terms/g/gross_profit_margin.asp.

¹²² To corroborate these gross margin figures, I compared them to the publicly traded Defendants' financial disclosure data. Smithfield reported a gross profit margin of 10% in 2008. Smithfield, Annual Report (Form 10-K) (June 26, 2008), <https://www.sec.gov/Archives/edgar/data/91388/000119312508141434/d10k.htm>. Tyson reported operating margins of 7.8% for its pork segment in 2008 (operating margins are lower, as they include additional overhead costs). Tyson, Annual Report (Form 10-K) (Nov. 20, 2008), https://www.sec.gov/Archives/edgar/data/0000100493/000010049308000060/form10k_09272008.htm.



Source: Agri

*Notes: Tyson and Hormel do not have pre-2009 data. Margin figures for Tyson and Hormel are the first three months in data: March 2009 for Tyson, November 2014 for Hormel.

Accordingly, when these margins are used as inputs in the critical elasticity equation assuming a five percent SSNIP, [REDACTED]

[REDACTED]

[REDACTED]

59. *Second*, to calculate the actual own-price demand elasticity for pork faced by a hypothetical monopolist, an economist studies quantity demand changes in response to changes in price. Using the Defendants' sales data and other economic control variables for demand, I use a standard log-linear regression model to assess the Class Pork Products own-

price demand elasticity.¹²³ I estimate that the own-price demand elasticity for pork is between -1.09 and -1.4, meaning that a 10 percent increase in the price of pork is associated with a 10.9 to 14 percent decline in pork units sold.¹²⁴ This estimate is corroborated with existing literature on pork's own-price elasticity: A USDA study from 2012 calculated pork's own-price elasticity at -1.26.¹²⁵ Agricultural economists Steven Meyer (a prominent pork industry economist) and co-author Barry Goodwin estimated that pork's own-price elasticity was -1.25 in 2021.¹²⁶ Two other economists, Glynn Tonsor and Jayson Lusk, similarly estimated that pork's own-price elasticity of demand is -1.4 using IRI data from 2016 to 2020.¹²⁷

¹²³ See Part IV.A for a description of the Defendants' data and economic control variables. I employ the variables specific to demand.

¹²⁴ I obtain -1.15 without using additional demand side control variables, -1.09 when controlling for cut-but-month fixed effects, and -1.4 when controlling for demand shocks such as Swine Flu, COVID-19, the prices of beef and chicken, and an index of pork recalls. I use the total cost of raising a live hog as an instrument for price. The instrument allows the model to account for changes in the supply curve. I use the same regression model approach as Tonsor and Lusk, who use the USDA's national pork cut-out price as an instrument. See Glynn Tonsor and Jayson Lusk, *Consumer Sensitivity to Pork Prices: A Comparison of 51 U.S. Retail Markets and 6 Pork Products*, Department of Agricultural Economics, Kansas State University (Mar. 5, 2021), Table 5, available at <https://www.agmanager.info/livestock-meat/meat-demand/meat-demand-research-studies/consumer-sensitivity-pork-prices-comparison>.

¹²⁵ Abigail Okrent and Julian Alston, *The Demand for Disaggregated Food Away-From-Home and Food-at-Home: Products in the United States*, U.S. DEPARTMENT OF AGRICULTURE (Aug. 2012), Table 6, available at https://www.ers.usda.gov/webdocs/publications/45003/30438_err139.pdf?v=3773.8. Note that the USDA references and older 1993 study (Huang 1993) showing that Pork was *inelastic* at 0.73.

¹²⁶ Steve Meyer and Barry Goodwin, *Structure and Importance of the U.S. Pork Industry*, NATIONAL PORK PRODUCERS COUNCIL (June 2021), Table 1, available at https://nppc.org/wp-content/uploads/2021/06/Competition_Paper_FINALWD.pdf.

¹²⁷ Glynn Tonsor and Jayson Lusk, *Consumer Sensitivity to Pork Prices: A Comparison of 51 U.S. Retail Markets and 6 Pork Products*. Department of Agricultural Economics, Kansas State University (Mar. 5, 2021), Table 5, available at <https://www.agmanager.info/livestock-meat/meat-demand/meat-demand-research-studies/consumer-sensitivity-pork-prices-comparison>.

60. Finally, the critical elasticity is compared to the market-wide own-price elasticity of demand. As shown above, the actual own-price elasticity of demand for pork is between -1.09 and -1.4, which is far below the lowest critical elasticity of -4.8 in Table 2 above. As all of the own-price elasticity of demand estimates are less than the estimated critical elasticities, it follows that a SSNIP of five percent would be profitable to a hypothetical monopolist of pork, and pork would be considered a relevant antitrust product market under the Horizontal Merger Guidelines.

4. Other Evidence That Pork Is a Relevant Antitrust Market

61. The antitrust agencies also consider the available and reliable evidence of industry participants, noting that a relevant antitrust market, as defined by a SSNIP test, may not necessarily align with how industry members conceive of the market.¹²⁸ However, in this case my review of the evidence reinforces the SSNIP-informed finding that pork constitutes its own relevant antitrust market, and that it should not be expanded to a broader definition inclusive of more pork substitutes. I present this evidence below.

a. Pork Has No Close Demand Substitutes

62. While producers of pork might consider chicken and beef as competitor proteins, analyses of consumer demand show the substitutability between pork and beef, and between pork and chicken is low.¹²⁹ As shown in Figure 1, U.S. consumption of pork has

¹²⁸ *Merger Guidelines* §4.1.

¹²⁹ The decision in *Kleen Products (Kleen Products LLC v. International Paper Company)*, 831 F.3d 919, 924, 95 Fed.R.Serv.3d 154 (7th Cir. 2016)) determines that having no close substitutes is an important determinant of cartel success. This is confirmed in the literature survey by Levenstein & Suslow (2006). See Margaret C. Levenstein and Valerie Y. Suslow, *What Determines Cartel Success?*, 44(1) JOURNAL OF ECONOMIC LITERATURE 43-95, 76 (2006) (“New entry or the increased use of substitutes ranks as the second most common important cause of cartel failure[.]”).

remained relatively flat as consumption of chicken has risen and consumption of beef has fallen. Economists empirically study demand substitutability between two products by measuring a “cross-price elasticity,” or the percent change in quantity demanded of one product in response to a percent change in the price of the other product. Positive values indicate that products are substitutes (such as coffee and tea), though not necessarily such strong substitutes to be part of the same relevant market, while negative values indicate that products are complements (such as coffee and sweetener). A cross-price elasticity of zero would mean that the products have no relation to one another.¹³⁰ Notably, the USDA estimates that the cross-price elasticity of pork with respect to the price of beef is 0.48, while the cross-price elasticity of pork with respect to the price of poultry is 0.28, indicating that these products are weak substitutes for pork.¹³¹

b. Industry Participants Believe Pork Is a Unique Market

63. Defendants agree that pork has no close substitutes and have described it as distinct from other proteins, with consumers generally unwilling to substitute pork for other proteins. A markets analysis prepared for Smithfield emphasizes that [REDACTED]

[REDACTED]

¹³⁰ Economic Research Service, *Food Demand Analysis*, U.S. DEPARTMENT OF AGRICULTURE (accessed Mar. 2022), available at <https://www.ers.usda.gov/topics/food-choices-health/food-consumption-demand/food-demand-analysis/#:~:text=The%20cross%2Dprice%20elasticity%20of,the%20price%20of%20another%20product>.

¹³¹ Abigail Okrent and Julian Alston, *The Demand for Disaggregated Food Away-From-Home and Food-at-Home: Products in the United States*, U.S. DEPARTMENT OF AGRICULTURE (Aug. 2012), Table A.10, available at https://www.ers.usda.gov/webdocs/publications/45003/30438_err139.pdf?v=3773.8.

¹³² A market report for Hormel similarly states that [REDACTED]

[REDACTED] An internal Tyson presentation on branding claims that the American perception of pork is “decoupled” from beef:

[REDACTED]

64. Defendants refer to the [REDACTED] in public statements and reports. Executives for Smithfield, Tyson, and Hormel have each distinguished pork as being a separate market from other proteins in earning calls.¹³⁵ Agri Stats describes pork as an [REDACTED] distinct from other proteins such as beef and broilers. According to their website,

¹³² SMITHFIELD02182015 at -2021, a Tops Analysis presentation citing Nielsen Perishables Group (emphasis original). Furthermore, the presentation states: [REDACTED]

SMITHFIELD02182020.

¹³³ HFC-PORKAT0000226945 at -950, a June 2011 report from the Perishables Group.

¹³⁴ TF-P-000198549 at slide 22. Original spelling is [REDACTED]

¹³⁵ Smithfield CFO Bo Manly stated, [REDACTED]

[REDACTED] JBS-PORK-00202081 at -087, a 12/8/2011 2:00PM, SFD - Q2 2012 Smithfield Foods Inc Earnings Conference Call.

Tyson CEO & Director Donald J. Smith stated, [REDACTED]

[REDACTED] TF-P-000695222 at -235, a 8/8/2016 Tyson Foods, Inc. (TSN) Q3 2016 Earnings Call.

Hormel Chairman, President, and CEO Jeff Ettinger stated, [REDACTED]

[REDACTED] SMITHFIELD01063775 at -777, a 11/23/10 Smithfield email excerpting Q42010 Hormel Foods Corporation Earnings Conference Call.

“Agri Stats has grown to be the premiere management reporting and benchmarking company for numerous industries: broiler, egg, turkey, swine, beef and dairy.”¹³⁶

65. Further, the pork, chicken, beef, turkey, and seafood producers each have their own distinct industry groups, indicating that each of those producers believe they operate in a separate market from other animal proteins.¹³⁷

c. Pork Supply Has Unique Production Facilities

66. Pork processing plants are designed to process swine and nothing else. As a result, processors of other types of animal protein could not cheaply or easily shift to producing pork in response to pork price increases. The physical dimensions and processing cuts of swine are materially different from chicken and cows. Similarly, pork production operates on a completely separate production timelines relative to the other major proteins.

¹³⁶ See Agri Stats’ homepage, (accessed February 2010), available at <https://web.archive.org/web/20100218115911/https://www.agristats.com/>. Similarly, see Agri Stats, Inc., *Partnership And Services*, available at <https://www.agristats.com/partnership> (“We service customers in the chicken, turkey, commercial egg, and swine industries . . .”).

¹³⁷ See, e.g., National Chicken Council <https://www.nationalchickencouncil.org/>; National Cattlemen’s Beef Association <https://www.ncba.org/>; National Pork Producers Council <https://nppc.org/>; National Turkey Federation <https://www.eatturkey.org/>; National Fisheries Institute identifying the Tuna, Salmond, Shrimp and Crab Councils <https://aboutseafood.com/about/councils/>.

5. Defendants Collectively Wield Market Power Via Their High Shares and Barriers to Entry

67. Having determined that pork is a relevant antitrust market, I now turn to assess whether Defendants collectively wield market power over pork, which would allow them to profitably artificially inflate prices over the competitive level. I analyze Defendants'

collective market share in pork, calculate the industry's concentration, and determine if the industry has high barriers to entry.¹³⁸

a. Defendants Collectively Have A Dominant Market Share

68. The Defendants' collective market share in the market for pork in the United States is overwhelming. Over the Conduct Period, Defendants and co-conspirators collectively account for 80.3 percent to 83.7 percent of market-wide hog slaughter capacity. For example, Table 3 below shows that Defendants collectively controlled 84 percent of the U.S. slaughter capacity in 2020.

TABLE 3: ESTIMATED DAILY U.S. HOG SLAUGHTER CAPACITY - 2020 (FALL)

Company	Heads/Day	Share
Smithfield	130,300	25.4%
JBS USA	93,000	18.2%
Tyson	81,800	16.0%
Seaboard*	32,700	6.4%
Triumph*	31,500	6.1%
Clemens	23,700	4.6%
Hormel	19,000	3.7%
All Defendants	412,000	80.4%
Non-Defendants	100,370	19.6%
Reported Total	512,370	100.0%

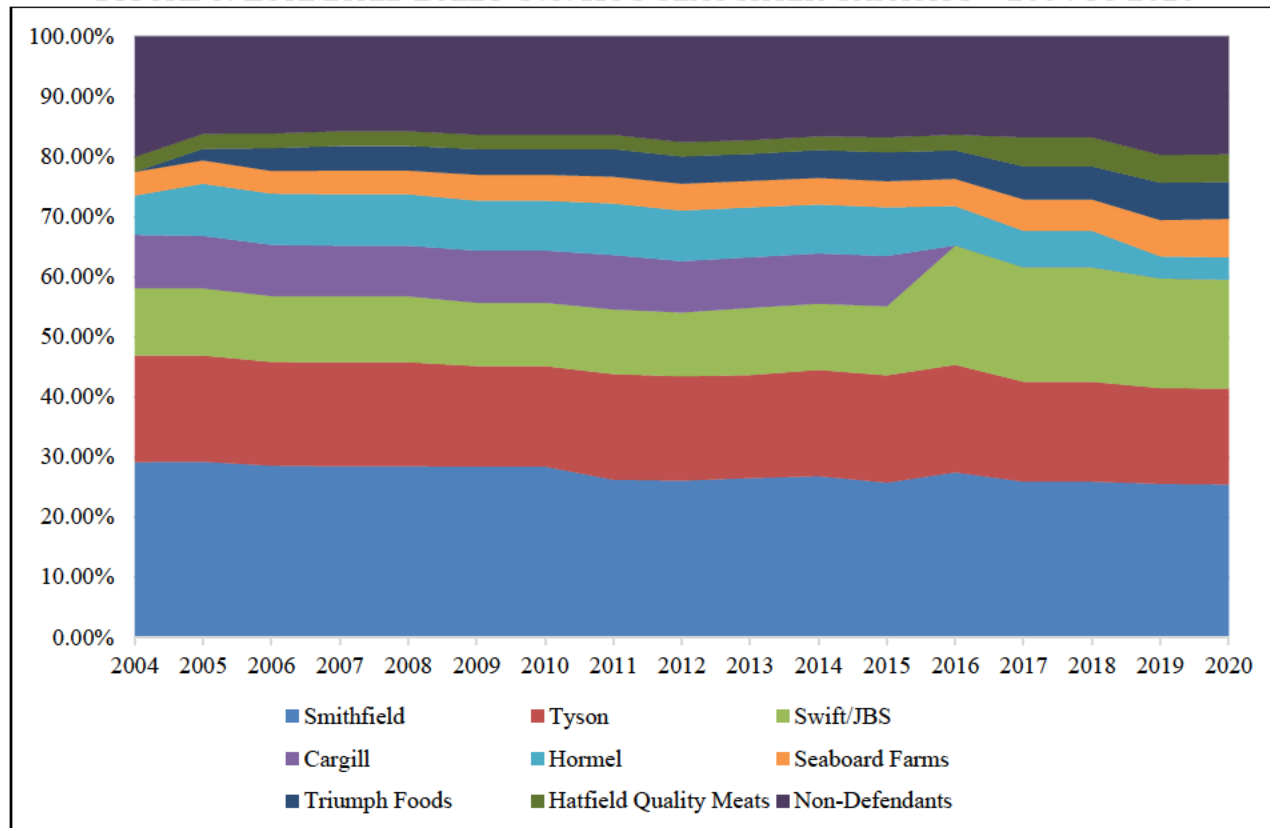
Source: Steve Meyer, *Pork packing: Just what is capacity?*, NATIONAL HOG FARMER, Oct. 5, 2020, available at https://cet.gcp.informamarkets.com/sites/cet.com/files/nhf-porkpackerreport_0.pdf.

Notes: *Seaboard Triumph Foods, LLC is an equal ownership joint venture between Seaboard Foods and Triumph Foods, LLC. Capacity is split evenly between entities. **Smithfield figures from Fall 2019.

¹³⁸ *Merger Guidelines* §5.2. High industry concentration and high barriers to entry were important determinants of cartel success in in Kleen Products (*Kleen Products LLC v. International Paper Company*, 831 F.3d 919, 924, 95 Fed.R.Serv.3d 154 (7th Cir. 2016)). This complements the findings in the economics literature. See, e.g., George A. Hay, and Daniel Kelley, *An Empirical Survey of Price Fixing Conspiracies*, 17 THE JOURNAL OF LAW AND ECONOMICS 13-38, 14-15 (1974) [hereafter Hay and Kelley]. See also John M Connor, *The Food and Agricultural Global Cartels of the 1990s: Overview and Update*, No. 1239-2016-101535 (2002).

Figure 8 shows Defendants' market shares over time. Notably, Defendants have collectively maintained market share above 80 percent for the duration of the class period.

FIGURE 8: ESTIMATED DAILY U.S. HOG SLAUGHTER CAPACITY – 2004 TO 2020



Source: Steve Meyer and National Hog Farmer data, see workpapers.

Notes: No data for 2008, 2010, and 2018. JBS acquired Cargill's pork business in 2015. The previous year's values are used. Seaboard Triumph Foods, LLC is an equal ownership joint venture between Seaboard Foods and Triumph Foods, LLC. Capacity is split evenly between entities.

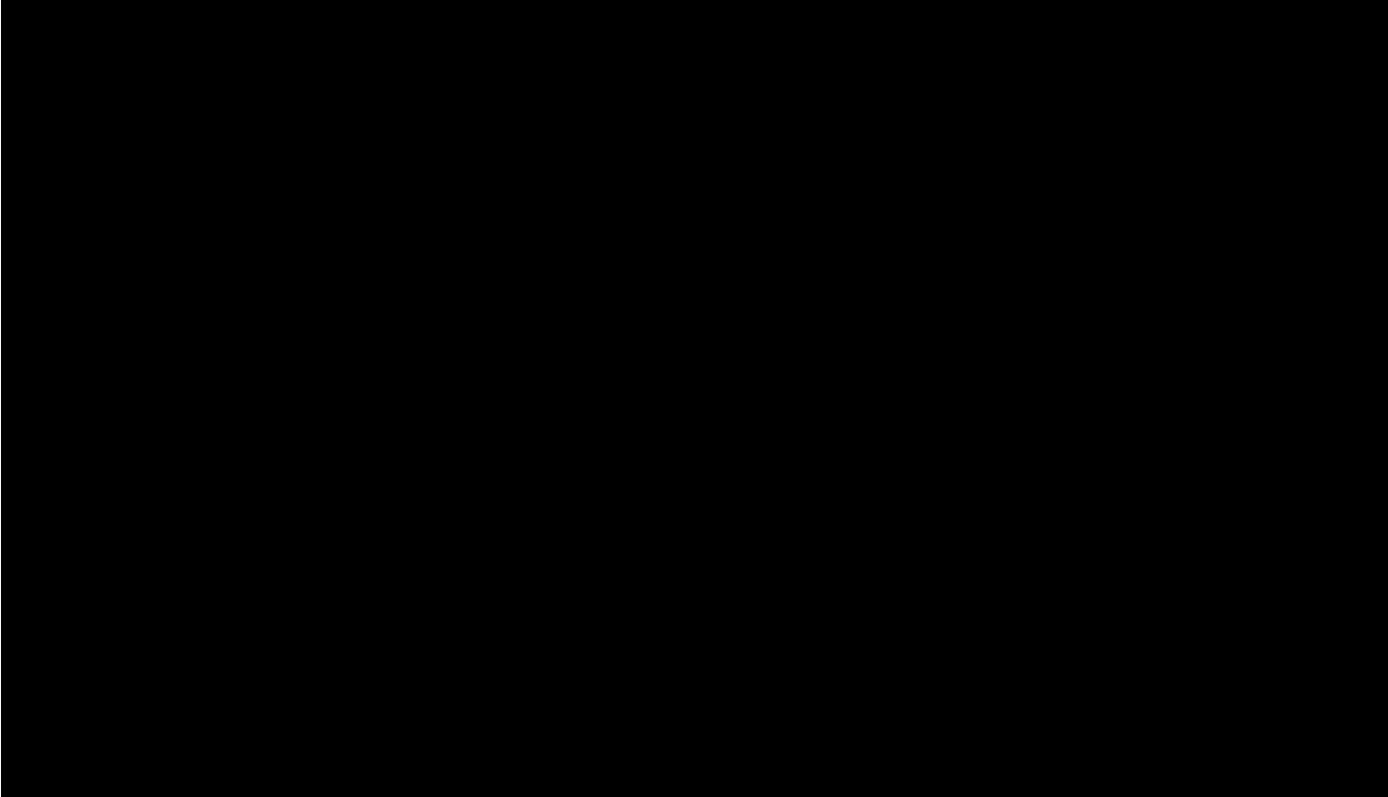
69. If Defendants acted as competitive entities, the Herfindahl-Hirschman Index ("HHI") of the pork industry is 1,372.¹³⁹ The agencies consider markets with such levels of concentration to be "unconcentrated".¹⁴⁰ However, if Defendants employed a cartel that allowed them to act *as-if* they were a single entity, as implied by the Challenged Conduct,

¹³⁹ See my market share workpapers for details.

¹⁴⁰ *Merger Guidelines* §5.3. ("Based on their experience, the Agencies generally classify markets into three types: Unconcentrated Markets: HHI below 1500 [] Moderately Concentrated Markets: HHI between 1500 and 2500 [] Highly Concentrated Markets: HHI above 2500").

the HHI rises to at well above 6,493. The antitrust agencies consider a market with HHIs above 2,500 to be “highly concentrated”.¹⁴¹ The agencies explain that in a merger context, “[m]ergers resulting in highly concentrated markets that involve an increase in the HHI of more than 200 points will be presumed to be likely to enhance market power.”¹⁴² Accordingly, Defendants acting as a cartel would certainly enhance their market power.

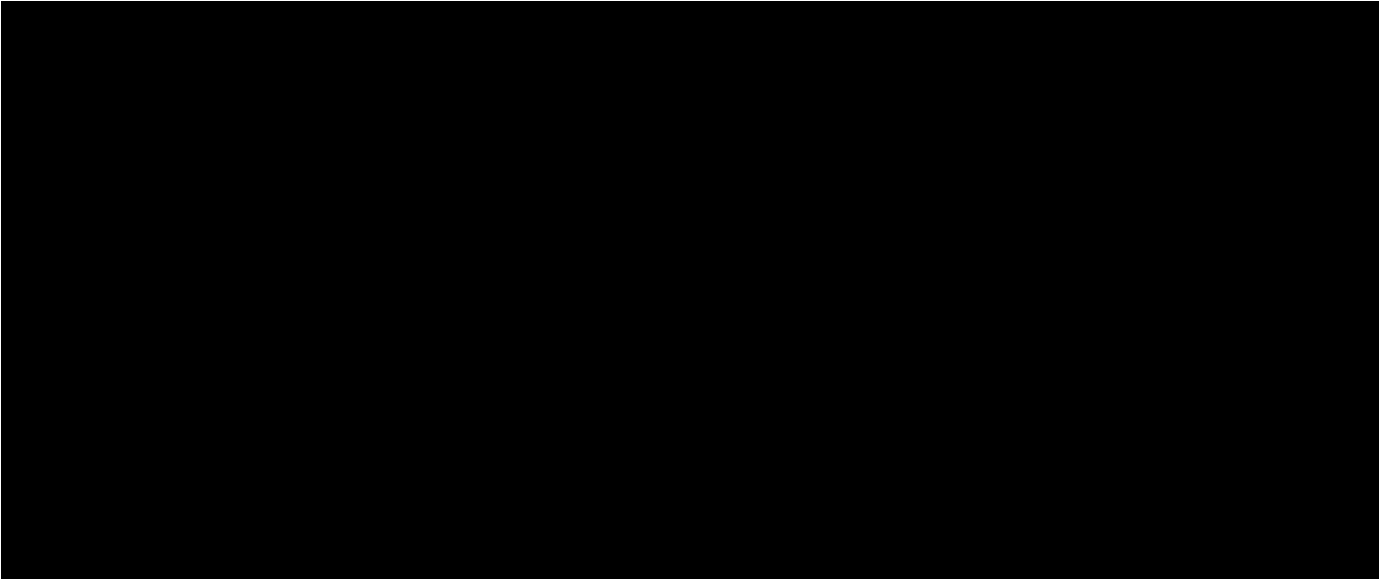
70. Defendants’ own documents confirm these market shares across time. A 2014 industry analyst presentation produced by Agri Stats shows an [REDACTED] market share among Smithfield, Tyson, JBS, Cargill, Hormel, Seaboard, Triumph, and Hatfield (Clemens).



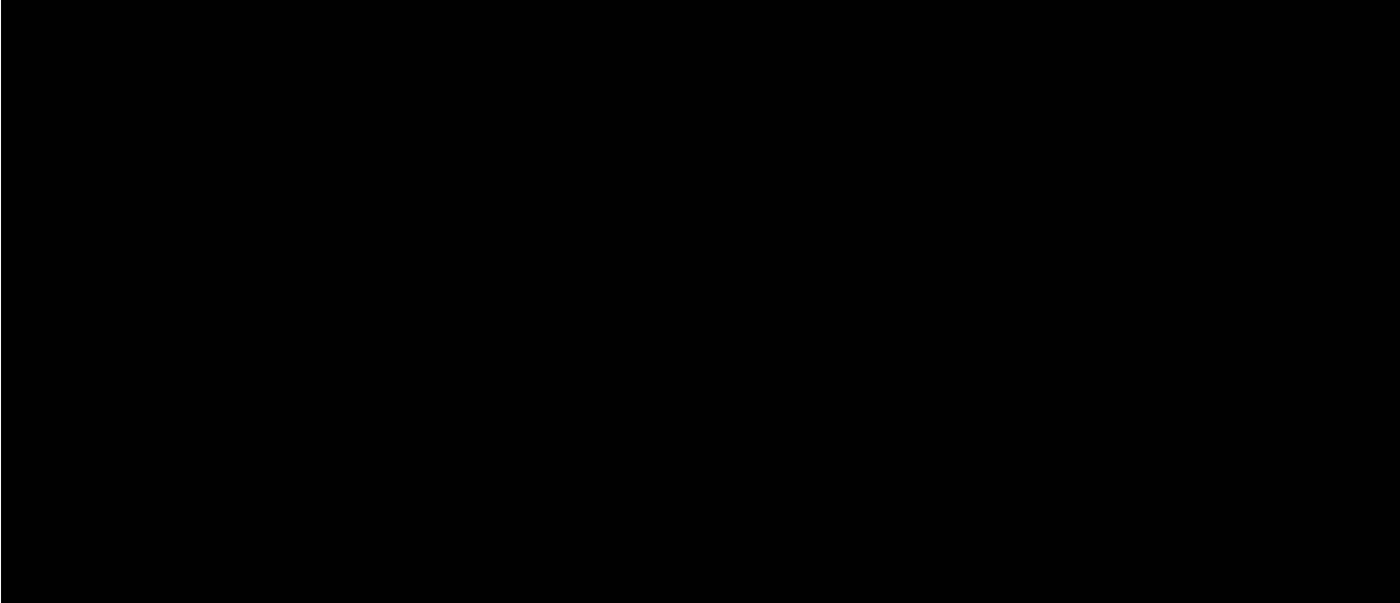
¹⁴¹ *Id.*

¹⁴² *Id.*

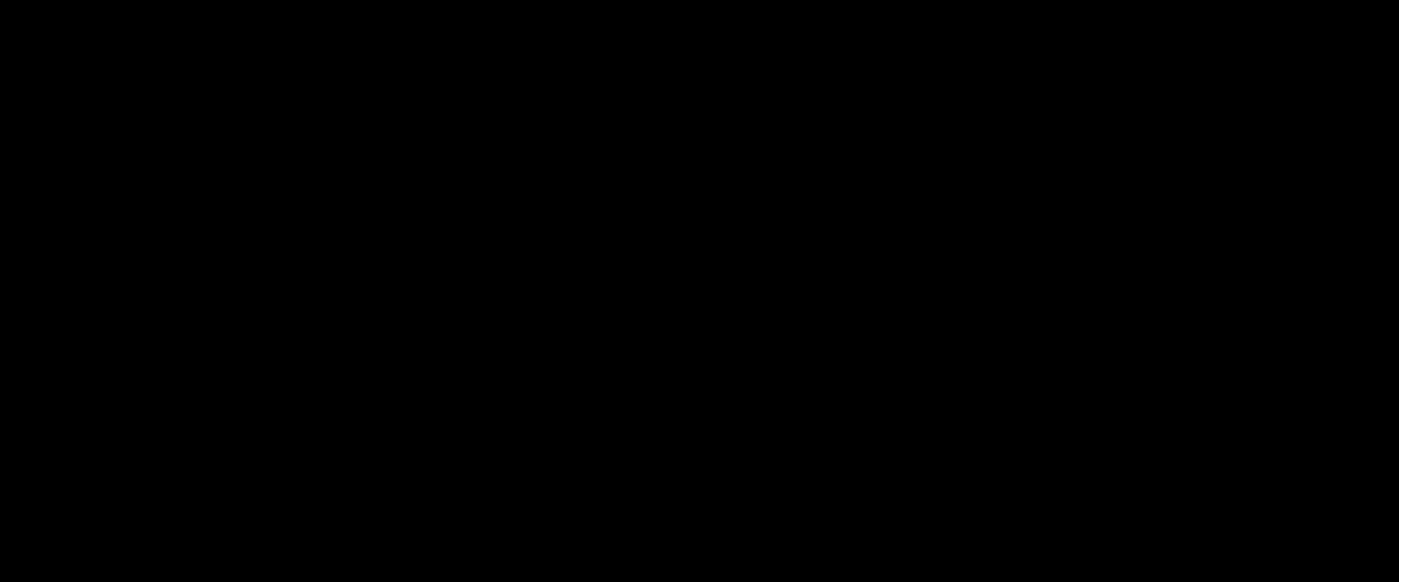
71. A 2015 industry analyst presentation produced by Hormel shows a [REDACTED] market share among Smithfield, JBS, Tyson, and Hormel, or [REDACTED] if accounting for Triumph-Seaboard in the “Other” category.



72. A 2016 industry analyst presentation produced by Hormel shows a [REDACTED] market share among Smithfield, JBS, Tyson, and Hormel, or [REDACTED] if accounting for Triumph-Seaboard in the “Other” category.



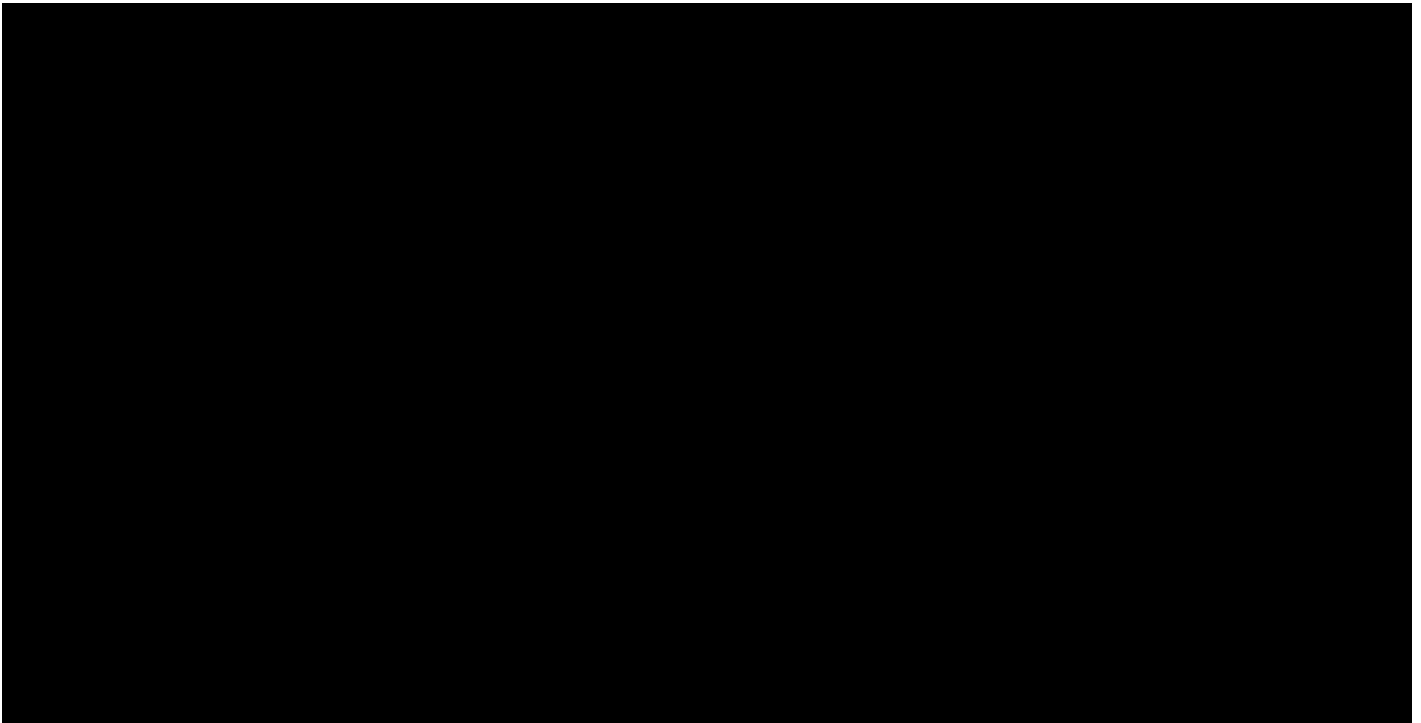
73. A 2017 industry analyst presentation produced by JBS shows a [REDACTED] market share among Smithfield, JBS, Tyson, and Hormel, or [REDACTED] if accounting for Triumph-Seaboard in the “Other” category.



74. A September 2017 slide from Seaboard indicates a [REDACTED] market share among JBS, Smithfield, Tyson, and Seaboard-Triumph, or [REDACTED] if accounting for Clemens and Hormel.



75. A 2018 industry analyst presentation produced by Hormel shows a [REDACTED] market share among Smithfield, JBS, Tyson, and Hormel, or [REDACTED] if accounting for Triumph-Seaboard in the “Other” category.



b. High Barriers to Entry Prevent Outside Competition

76. Economists recognize that, although high barriers to entry are not necessary for collusion to occur, they can facilitate it by decreasing the likelihood that the collusive equilibrium will be undermined by a new entrant undercutting the cartel price.¹⁴³ Without high entry barriers, a hypothetical monopolist who successfully raised prices and began to enjoy monopoly profits could face competition from outside entities. Seeing that there is money to be made, outside firms could rush in and compete away the monopoly profits. However, this is not a concern in industries that are difficult to enter. The agencies consider entry to be easy if it is “timely, likely, and sufficient in its magnitude, character, and scope to deter or counteract the competitive effects of concern.”¹⁴⁴ Below, I show that there are high barriers to entry that would prevent an outsider from easily entering the pork industry. These barriers to entry include know-how limitations, economies of scale, and the cost and time associated with creating new swine complexes.

i. Industry Participants Recognize Significant Barrier for New Entrants to the Market

77. Defendants’ internal documents note the substantial barriers to entry in the industry. For example, Defendant pork processors believe that the [REDACTED]

¹⁴³ William Kolasky, *Coordinated Effects in Merger Review: From Dead Frenchmen to Beautiful Minds and Mavericks*, Address to the American Bar Association Section of Antitrust Law Spring Meeting, Washington DC (2002) [hereafter, Koloasky (2002)], available at <https://www.justice.gov/atr/speech/coordinated-effects-merger-review-dead-frenchmen-beautiful-minds-and-mavericks>, Part III.D (“[Although] high entry barriers may facilitate cartel behavior, they are not essential to it...while most of our cartel cases involve industries in which entry tends to be difficult, there are notable exceptions, such as in the Division’s many bid-rigging cases in the road building industry. The road building industry, at least at the time of the conspiracies, was not difficult to enter, yet the Division turned up numerous cartels.”). See also Levenstein & Suslow (2006) at 86.

¹⁴⁴ *Merger Guidelines* §9.

[REDACTED]

[REDACTED]. According to investor analysis at Smithfield, [REDACTED]

[REDACTED]¹⁴⁵ Similar internal Smithfield analyses note that [REDACTED] in hog production, and that the [REDACTED]

[REDACTED]¹⁴⁶ The same analysis claims that [REDACTED]

[REDACTED]¹⁴⁷ A Tyson bacon presentation claims that a potential processor entrant would need [REDACTED]

[REDACTED] Hormel, in a 2006 letter to the DOJ opposing Smithfield's merger with a pork producer, wrote that [REDACTED]

[REDACTED]¹⁴⁹

¹⁴⁵ SMITHFIELD00789505 and SMITHFIELD00789506, a 2013 email from Robert Sweeney of Goldman Sachs to Smithfield employees regarding suggested answers to potential questions on earnings call.

¹⁴⁶ SMITHFIELD00898940 at -946 and -951, a Smithfield April 1-3, 2013 Investor Presentation.

¹⁴⁷ *Id.* at -957.

¹⁴⁸ TF-P-000128650 at slide 18, a 2016 Tyson [REDACTED]

¹⁴⁹ HFC-PORKAT0000296667 at -681, [REDACTED]

ii. Cost and Time of Swine Complex Creation Makes New Entry Risky

78. Building new pork processing centers takes multiple years and requires hundreds of millions of dollars. For example, a 2015 press release by Seaboard and Triumph acknowledged that their forthcoming pork processing plant would [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

79. Defendants are cognizant of the protection conferred by the high costs associated with investment in new complexes and plants to process pork. For example, in analyzing the competitive impacts of a 2006 merger between Smithfield and Premium Standard Farms, Hormel commissioned a report that explained, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] In a 2010 analysis of ham, Hormel noted that Hormel [REDACTED]

[REDACTED]

¹⁵⁰ CLMNS-0000083482 at -82-83, a Sioux City Journal story about Seaboard Foods and Triumph Foods' pork processing plant venture.

¹⁵¹ HFC-PORKAT0000296688 at -716, [REDACTED] presented by Hormel Foods.

¹⁵² A 2012 email between the VP of Tyson investor relations, Jon Kathol, and a researcher at potential investor Brandes explained, [REDACTED]

[REDACTED]

[REDACTED]¹⁵³

80. Industry analysts similarly believe that barriers to entry are high. A 2005 analysis of competition in the industry from Rockhurst University emphasized, [REDACTED]

[REDACTED] due in part to [REDACTED]

[REDACTED]¹⁵⁴ A 2014 investment report for Tyson Foods noted that

[REDACTED]

[REDACTED]¹⁵⁵

A financial analysis of Tyson in the course of a managerial finance project at Western Washington University from the same year explicitly confirmed this observation, explaining,

[REDACTED]

[REDACTED]¹⁵⁶

¹⁵² HFC-PORKAT0000250693 at slide 5, [REDACTED]

¹⁵³ TF-P-000851430, emails between Jon Kathol of Tyson and Edmond Chen of Brandes.

¹⁵⁴ SMITHFIELD04707335 at -39, [REDACTED]

[REDACTED] by Shelly Phalen for Dr. Myers Gartland, Rockhurst University.

¹⁵⁵ TF-P-000036749 at -50, a 2014 report on Tyson Foods from Miller Tabak & Co. LLC, an asset management firm.

¹⁵⁶ TF-P-001172524 at -35, [REDACTED] by Michael Custance for Professor D.R. Fewings, Western Washington University.

iii. Know-How Limitations Prevent New Entry

81. Knowledge barriers lower the cost of expansion for incumbent pork processors, particularly the most successful, in ways that cannot easily be replicated by entrants.

82. Compounding the risks associated with the high levels of initial capital investment required is the likelihood of rapid technological change in the industry. VP of Tyson investor relations Jon Kathol wrote in 2012 [REDACTED]

[REDACTED] Further, Kathol noted his employer's strong informational advantage, bragging [REDACTED]

[REDACTED] Similarly, in response to questions regarding vertical integration, a Smithfield presentation explained, [REDACTED]

83. Beyond the considerable institutional knowledge required to operate a plant successfully, opening a plant raises special challenges. Government food safety, labor, and environmental regulations in hog slaughtering create obstacles that incumbents have navigated in the past that entrants would be unfamiliar with. Hormel's 2006 industry analysis

¹⁵⁷ TF-P-000851430, emails between Jon Kathol of Tyson and Edmond Chen of Brandes.

¹⁵⁸ *Id.*

¹⁵⁹ SMITHFIELD00789505 and SMITHFIELD00789506, [REDACTED]

emphasized that [REDACTED]

[REDACTED] and [REDACTED]

[REDACTED]¹⁶⁰ The report pointed out, as an example, the fact that [REDACTED]

[REDACTED] been recently extended from 2003 to 2007. Similarly, [REDACTED]

[REDACTED] Navigating such restrictions serve as an entry barrier above and beyond the costs of capital investment.

84. Industry analysts echo these legal hurdles. The Western Washington University financial analysis described above noted [REDACTED]
[REDACTED]—as a key entry barrier.¹⁶² Such regulations push margins down, to the extent that without key institutional knowledge, potential entrants face an inability to recoup investments. Economic analysis out of Rockhurst University stated that [REDACTED]

[REDACTED]¹⁶³ Further, the report explained, [REDACTED]

¹⁶⁰ HFC-PORKAT0000296688 at -716, [REDACTED]

[REDACTED] presented by Hormel Foods.

¹⁶¹ *Id.*

¹⁶² TF-P-001172524 at -35, [REDACTED] by Michael Custance for Professor D.R. Fewings, Western Washington University.

¹⁶³ SMITHFIELD04707335 at -38, [REDACTED]

[REDACTED] by Shelly Phalen for Dr. Myers Gartland, Rockhurst University.

—incurred if, for example, an entrant lacks the foundational knowledge regarding adherence—

iv. Economies of Scale Prevent New Entry

85. Economies of scale pose a barrier to new entry by a potential rival because of the high fixed costs necessary to process pork. Pre-established firms such as the Defendant Processors are already producing at scale. Such production levels allow incumbents to spread their fixed costs over more units of output, which results in lower average unit costs relative to a potential new rival entering the industry at a smaller scale.

86. Defendants note the economies of scale in the industry that benefit incumbent processors. Hormel’s 2006 industry analysis explicitly stated,

[REDACTED]

Brand analysis by Jefferies describes the relative infrequency of entrant success, owing in part to an inability to reach sufficient scale:

[REDACTED]

¹⁶⁴ *Id.* at -39.

¹⁶⁵ HFC-PORKAT0000296688 at -716,

presented by Hormel Foods.

¹⁶⁶ TF-P-000997485 at -86, Jefferies regarding the importance of brands to consumer decision processes.

B. Direct Evidence of Defendants' Market Power

87. While high market shares and high barriers to entry are indirect evidence of market power, the direct evidence of defendants' collective ability to artificially inflate prices above the competitive level confirms their collective market power. My overcharge regressions in Section IV below reveal that pork prices were inflated by 12.8 during the Class Period, after accounting for all other supply and demand factors that could reasonably explain a change in price. The ability to artificially inflate prices over the competitive level is the hallmark of market power. While the indirect evidence tests the ability of a *hypothetical* monopolist to artificially inflate prices by 5 percent, the direct evidence shows that Defendants' alleged cartel, behaving as a *not-so-hypothetical* monopolist, was in reality able to artificially inflate prices by 12.8 percent over competitive levels.

III. ECONOMIC ANALYSIS OF QUALITATIVE EVIDENCE OF COLLUSION

88. In this section, I analyze the qualitative evidence using a standard framework from economics using evidence common to the Class. I first review the economic literature on price-fixing cartels and demonstrate that the qualitative evidence is indicative of anticompetitive conduct based on well-established criteria recognized by economists. These criteria identify when information exchanges among rivals can enable firms to artificially inflate prices and restrain competitive levels. I then show that the qualitative evidence in this case satisfies these criteria. Furthermore, this qualitative evidence shows that the Challenged Conduct adversely affected all Class Members, implicated all Defendants, and affected all pork products.

A. Economic Criteria for Assessing Qualitative Evidence in a Price-Fixing Cartel

89. Economists use qualitative evidence to study economically significant aspects of cartel behavior, including: (1) monitoring output or prices; (2) developing organizations to effectuate cartel policies; and (3) developing inducements to support collusion. As explained below, the qualitative evidence in this case indicates that Defendants did all of these things.

90. For centuries, economists have studied monopolies, cartels, and their effect on competition and economic welfare.¹⁶⁷ While most of the economic profession is focused on quantitative analysis, economists have frequently brought their expertise to bear in analyzing documentary evidence of communications among cartel members and other qualitative aspects of cartel organization and behavior. In an article published in the *Journal of Economic Literature*, Professors Margaret Levenstein and Valerie Suslow review the empirical economic literature studying the determinants of cartel success.¹⁶⁸ As they explain, economists recognize that cartels often achieve collusion through the “development of sophisticated and flexible organizations,”¹⁶⁹ which they establish “over time as a result of organizational learning.”¹⁷⁰ Economists also recognize the “difficulties in observing and quantifying such information [on organizational learning] for a large number of

¹⁶⁷ See, e.g., Levenstein & Suslow (2006). See also MODERN IO at 122-156; Jonathan B. Baker, *The Case for Antitrust Enforcement* 17(4) J. OF ECON. PERSPECTIVES (2003) 27-50. See also ADAM SMITH, AN INQUIRY INTO THE NATURE AND CAUSES OF THE WEALTH OF NATIONS 660 (W. Strahan & T. Cadell, London 1776) (“People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices.”).

¹⁶⁸ Levenstein & Suslow (2006).

¹⁶⁹ *Id.* at 67.

¹⁷⁰ *Id.*

industries.”¹⁷¹ For this reason, economic case studies, which focus on a single cartel within a single industry, relying less on large data sets and more on qualitative evidence, “are much more amenable to studying organizational issues[.]”¹⁷² Professors Levenstein and Suslow explain that “[s]tudies of U.S. cartels are often based on records from prosecutions of cartels.”¹⁷³

1. Monitoring Output or Prices

91. Professors Levenstein and Suslow explain that “[c]ollusion in general implies ... that the rival sellers in some manner arrive at an understanding as to what price to charge or what outputs to produce, or both.”¹⁷⁴ Economic case studies employ qualitative evidence to analyze how cartels develop organizational structures for monitoring cartel members’ prices, output, or both.¹⁷⁵ The economic literature reveals that cartels have devised a variety of mechanisms for the “collection and dissemination of information.”¹⁷⁶ For example, Professors David Genesove and Wallace Mullin studied the information-collection procedures of a sugar-refining cartel.¹⁷⁷ In a paper published in the *American Economic Review*, Professors Genesove and Mullin explain that “[o]ur window into the inner workings

¹⁷¹ *Id.* at 69.

¹⁷² *Id.* In their literature review, Professors Levenstein and Suslow specifically fault one study for failing to “examine the internal records of the cartels involved” to analyze “organizational issues.” *Id.* n. 68.

¹⁷³ *Id.* at 49 n. 18.

¹⁷⁴ *Id.* at 45.

¹⁷⁵ *Id.* at 69-71.

¹⁷⁶ *Id.* at 69.

¹⁷⁷ David Genesove & Wallace Mullin, *Rules, Communication, and Collusion: Narrative Evidence from the Sugar Institute Case* 91(3) AM. ECON. REV. (2001) [hereafter Genesove & Mullin (2001)]. See also David Genesove & Wallace Mullin, *The Sugar Industry Learns to Organize Information Exchange*, in NAOMI LAMOREAUX, DANIEL RAFF, AND PETER TEMIN, EDS., LEARNING BY DOING IN MARKETS, FIRMS, AND COUNTRIES 103-38 (University of Chicago Press 1999).

of a cartel is a remarkable series of notes on the weekly meetings of the Sugar Institute.”¹⁷⁸ The authors explain that these documents provide valuable economic information by providing both “a record of the *communication* among the refiners”¹⁷⁹ and “the *reasoning* behind firms’ actions.”¹⁸⁰ Citing an interview-based economic study by Professor Alan Blinder of Princeton, the authors note that “a firm’s explanation of its conduct is also proof, since a theory describes the ‘chain of reasoning’ which motivates the firm.”¹⁸¹ More generally, Professors Levenstein and Suslow review case studies spanning nineteen industries that used joint-sales agencies and other organizational structures as “schemes for sharing information” among cartel members.¹⁸² In this case, the Agri Stats reports allowed the direct monitoring of competitor’s output and prices.

2. Developing Organizations to Effectuate Cartel Policies

92. Professors Levenstein and Suslow also review evidence of cartels’ tendency to “develop hierarchical organizations to effect cartel policies.”¹⁸³ For example, a prominent electrical equipment cartel from the 1950s used a two-tier organization structure. This cartel, made up of some forty electrical equipment manufacturers, set prices on twenty products with annual sales of \$2 billion, including switch gears, transformers, turbine generators, industrial controls, and other electrical equipment. For many product lines, there were two

¹⁷⁸ Genesove & Mullin (2001) at 379.

¹⁷⁹ *Id.* at 380 (emphasis in original).

¹⁸⁰ *Id.* (emphasis in original).

¹⁸¹ *Id.* (citing Alan Blinder, *Why Are Prices Sticky? Preliminary Results from an Interview Study*, in EYTAN SHESHINSKI AND YORAM WEISS, EDS., *OPTIMAL PRICING, INFLATION, AND THE COST OF PRICE ADJUSTMENT* 409-21 (MIT Press 1993)).

¹⁸² Levenstein & Suslow (2006) at 69.

¹⁸³ *Id.* at 72-74.

levels of cartel organization: (1) “a high level group of top executives and general managers”, and (2) “a working level group of sales managers”.¹⁸⁴ This case, involving both General Electric and Westinghouse Corporations, generated the first jail sentences imposed under the Sherman Act. Similarly, a citric-acid cartel from the early 1990s included one tier of “senior executives responsible for determining the broad outline of the cartel agreement,”¹⁸⁵ and a second tier of “lower-level executives responsible for the day-to-day workings of the cartel[.]”¹⁸⁶

93. Such day-to-day cartel workings may be done by the firms directly, or it may be outsourced to a third party.¹⁸⁷ Professors Robert Marshall and Leslie Marx write in *The Economics of Collusion* that “[c]artel firms may be reticent to allow fellow cartel members access to their production facilities, or their sales records, for audit purposes, but each firm may be willing to grant such access to a third party that works on behalf of the cartel.”¹⁸⁸ Agri Stats played this exact role in the conspiracy.

3. Developing Inducements to Support Collusion

94. Professors Levenstein and Suslow also review qualitative evidence on how cartels create inducements to support collusion.¹⁸⁹ They explain that cartels have adopted several arrangements to induce compliance among their membership, including regular meetings that allowed cartel members to “‘complete the contract’ by adjusting the agreement

¹⁸⁴ *Id.* at 72-73.

¹⁸⁵ *Id.* at 73.

¹⁸⁶ *Id.*

¹⁸⁷ *ECONOMICS OF COLLUSION* at 130.

¹⁸⁸ *Id.* at 132.

¹⁸⁹ Levenstein & Suslow (2006) at 71-72.

to evolving external conditions, such as fluctuations in demand.”¹⁹⁰ As explained below, Agri Stats provided inducements to support and enforce collusion among the cartel’s members via the “pricing opportunities” it identified for Defendants.

B. Qualitative Evidence of the Challenged Conduct in the Record Satisfies Criteria Recognized by Economists as Indicative of Anticompetitive Conduct

95. In this section, I review the documentary evidence showing that Defendants’ Challenged Conduct comports with what economists consider anticompetitive behavior. Beginning in 2009, Defendant Pork Processors used Agri Stats as a means to communicate competitively sensitive information concerning firm-specific, plant level pricing and output among themselves. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

¹⁹⁰ *Id.* at 71.

¹⁹¹ AGSTAT-P-0000019809, a March 2009 email from Agri Stat’s Brian Snyder (VP) to Seaboard’s Brad Hamilton, [REDACTED]

See also AGSTAT-P-0000019810

¹⁹² *See* Appendix Table 1.

[REDACTED]

96. Below, I explain how the Defendant's deanonymized the Agri Stats reports to view their rivals' disaggregated, firm-specific price and output data. I map the qualitative evidence to the factors, as explained above, economists consider as indicative of cartel: (1) monitoring of current and future output or prices; (2) developing organizations to effectuate cartel policies; and (3) developing inducements to support collusion. The record evidence from this case satisfies all three prongs. I then review the qualitative evidence showing that Defendants in fact used these reports to make pricing decisions.

1. Defendants Deanonymized the Agri Stats Data—and Agri Stats Knew It

97. Before reviewing the Agri Stats reports themselves, it is important to establish that Defendants could deanonymize the individual facilities contained in the report. This means, for example, [REDACTED]

[REDACTED]

98. Antitrust enforcers recognize that the deanonymized, firm-specific data is a hallmark of anticompetitive information sharing.¹⁹⁴ To assess potentially anticompetitive information exchanges, the antitrust agencies describe “safety zones” of types of information

¹⁹³ The Agri Stat reports were current as of the previous month. In addition, the “Data Miner” tool discussed below showed week-old prices.

¹⁹⁴ Delegation of the United States, *Roundtable on Information Exchanges Between Competitors under Competition Law*, OECD Directorate For Financial and Enterprise Affairs, Competition Committee meeting, 11-14 (Oct. 2010), available at <https://www.ftc.gov/sites/default/files/attachments/us-submissions-oecd-and-other-international-competition-fora/1010informationexchanges.pdf>.

exchanges that are unlikely to be challenged.¹⁹⁵ As set forth in a 1996 statement on health care, the agencies set up the following three prongs for an information exchange to fall into the “safety zone”:

In order to qualify for this safety zone, the collection of information must: (1) be managed by a third party; (2) contain information based on data that is more than three months old; and (3) contain shared data aggregated from at least five providers, of which no individual provider represents more than 25 percent, and be sufficiently aggregated to prevent identification of prices charged by any individual provider.¹⁹⁶

99. Agri Stats, by its nature of being a third party, satisfies the first condition. However, the Challenged Conduct fails the second and third prong. The Agri Stats reports contain current pricing information (*month-old* via the Sales Report or even *week-old* via the “Data Miner”). While the Agri Stat data usually contains more than five individual processing facilities, the data generally are not “sufficiently aggregated to prevent identification of prices charged by any individual provider”.¹⁹⁷ As shown below, Defendants routinely deanonymized the Agri Stat reports, allowing them to assess individual product prices from individual competitor’s facilities.

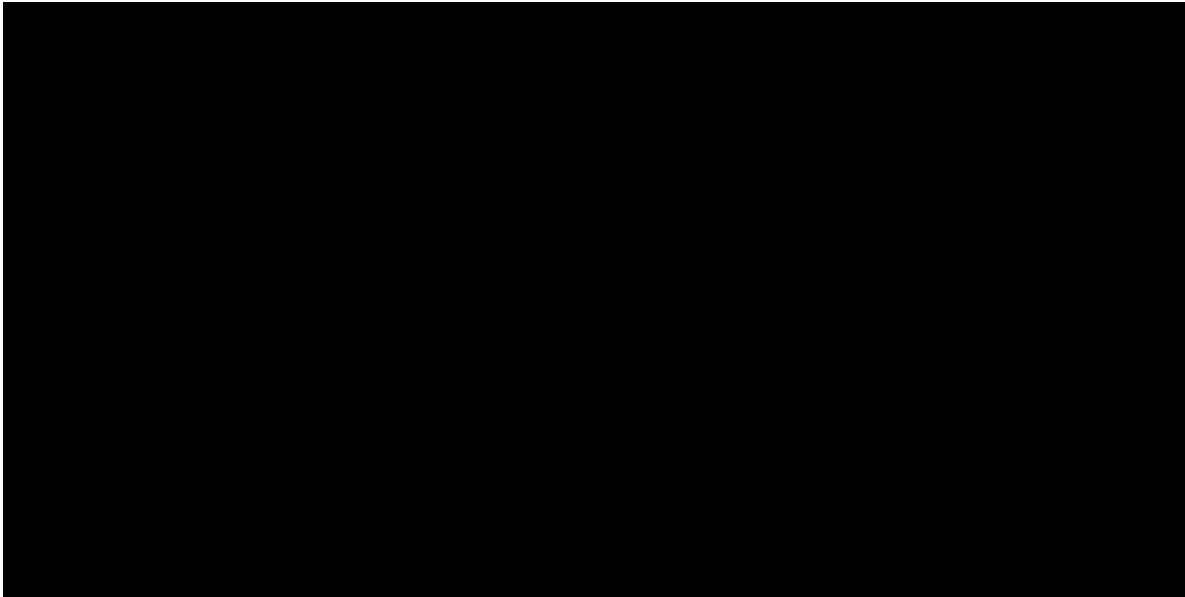
100. Although Agri Stats nominally anonymized each participating processing plant, in practice it was possible to identify individual competitor’s facilities based on their data characteristics. While each Defendants’ report only explicitly identifies their own

¹⁹⁵ *Id.* at 2. (“The following text reviews how U.S. courts, and the U.S. Department of Justice Antitrust Division (“DOJ”) and the Federal Trade Commission (“FTC”) (collectively, “the antitrust agencies”), have applied Section 1 to exchanges of price and other information among competitors. It also describes the designated “safety zones” in which, absent extraordinary circumstances, the antitrust agencies are likely to view information exchanges as legitimate.”).

¹⁹⁶ *Id.* at 15.

¹⁹⁷ *See* Part III.B.1.a-c.

processing plant's data, each of the participating plants are listed prominently at the front of the report. Figure 15 below shows an example from the top of a Sales Report.



101. The evidence shows that Processor Defendants used this participant list, in conjunction with their industry experience of each plant's individual characteristics, to deanonymize the Agri Stat Reports. There are numerous examples of internal analyses conducted by Defendants using Agri Stats data where the competitor facilities have been identified. For example, an internal Triumph/Seaboard foods analysis from December 2014 shows an [REDACTED]

[REDACTED]. The Triumph analyst was able to identify the [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

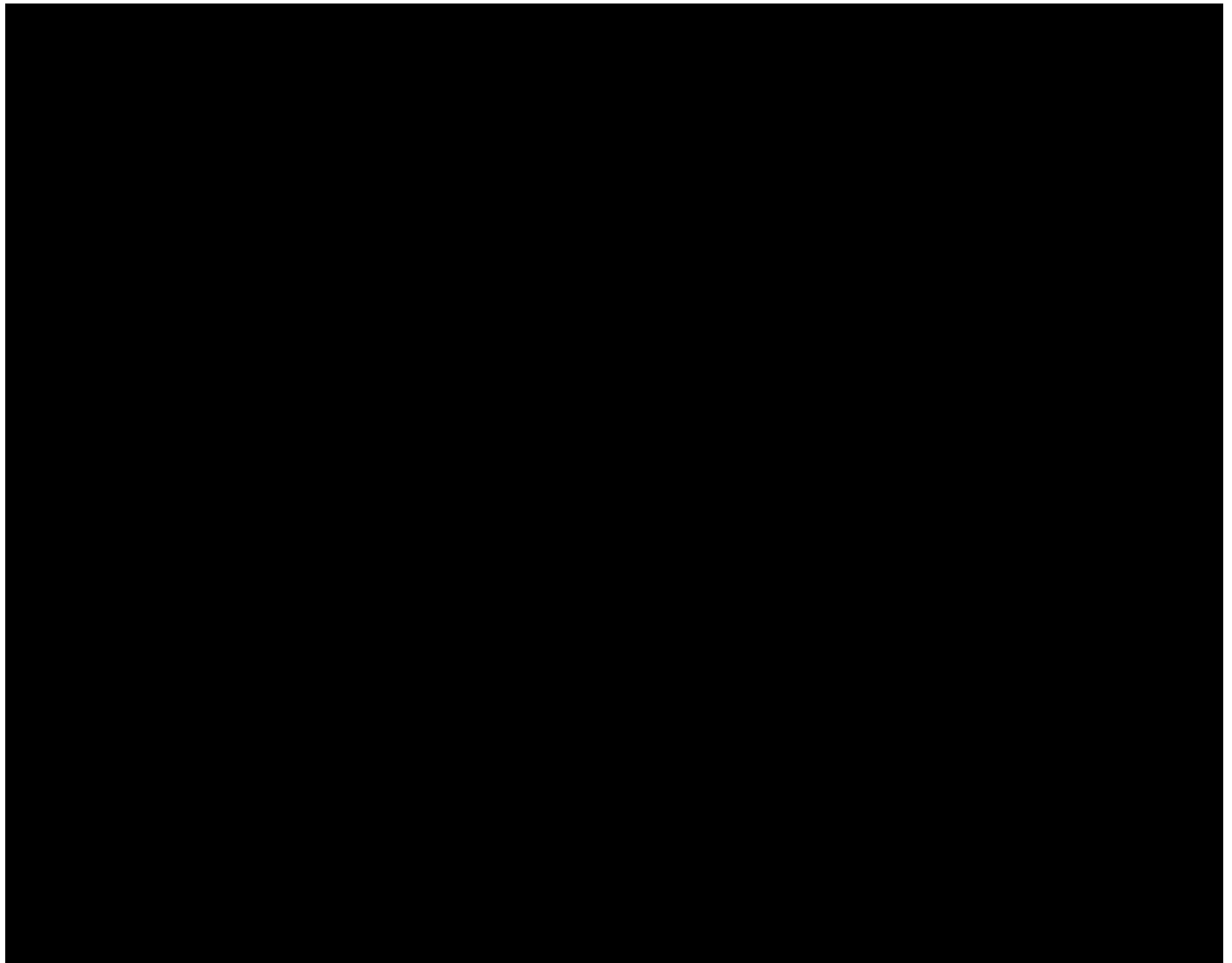
[REDACTED]

.¹⁹⁸ There are other deanonymized Agri Stats internal analyses in the record.¹⁹⁹

¹⁹⁸ See also similar deanonymized reports at TF-P-000368309 (June 2013), TF-P-000408068 (April 2014), TF-P-000445554 (June 2015), TF-P- 000475539 (June 2016), TF-P-000231543 (May 2017) and TF-P-000231540 (April 2018).

¹⁹⁹ See, e.g., TF-P-000218763, a June 2010 Tyson analysis showing Agri Stat data deanonymized for Beardstown (JBS), Clinton, and Monmouth (Smithfield). The most recent [REDACTED] tab is from April 2010. TF-P-000205959 and TF-P-000205960, a similar January 2011 analysis in which Deb McConnell directs recipients to August, September, and October [REDACTED] and notes that [REDACTED]

[REDACTED] See also TF-P-000100077 for November 2010 and TF-P-000102225 for August 2011.



102. Defendants discussed the process, value, and confidentiality of Agri Stats deanonymization in email exchanges. For example, in a May 2012 email [REDACTED]
[REDACTED] Tyson's Jerry Pfeifer (Fresh

Meats VP Controller) commented that [REDACTED]

[REDACTED]

[REDACTED]²⁰⁰

A February 2010 email exchange between two Tyson employees reads [REDACTED]

[REDACTED]

[REDACTED]²⁰¹ Another May 2012 email from Tyson's McConnell to Tyson's Crystal Coburn reads: [REDACTED]

[REDACTED]²⁰²

Tyson executives also repeatedly urged confidentiality and discretion in advertising that they had deanonymized the reports. In an August 2012 email, a Tyson Fresh Meat VP writes that the Agri Stats [REDACTED] and goes on to advise email recipients [REDACTED]. Similarly, a January 2012 email from Tyson's Deb McConnell to multiple executives states [REDACTED]

²⁰⁰ TF-P-000515626.

²⁰¹ TF-P-000257671. *See also* TF-P-000316394 and TF-P-000316395 (an August 2012 email and attachment from Crystal Coburn to Todd Neff, containing the May 2012 Agri Stats ranked tab with four new participants highlighted. As requested by Deb McConnell, she forwards it Sumio Matsumoto, writing, [REDACTED]

[REDACTED] Matsumoto identifies the new participants as [REDACTED]. He notes that the [REDACTED]

²⁰² TF-P-000304473.

²⁰³ TF-P-000538548 and TF-P-000538549. *See also* TF-P-000212871 (a September 2011 internal Tyson e-mail from Deb McConnell to Messerole, Kies, Kizer, Grothe McNamara, McCoy and Schmitz [REDACTED])

[REDACTED]

[REDACTED]

[REDACTED] 204

103. Importantly, Agri Stats was apparently aware that Defendants were successfully deanonymizing their reports. For example, in a June 2012 email exchange between Tyson's Debbie McConnell and Agri Stats' Josh Edwards, McConnell discusses

[REDACTED]

[REDACTED]

[REDACTED] 205 Similarly, in an August 2012 email, McConnell emails Agri Stat asking for [REDACTED]

[REDACTED] a request that only makes sense if someone were trying to deanonymize the facilities.²⁰⁶ In a June 2015 email between Agri Stats and Smithfield, an Agri Stats account manager provides Smithfield information [REDACTED]

[REDACTED] 207

²⁰⁴ TF-P-000213274.

²⁰⁵ TF-P-000305910 [REDACTED]

²⁰⁶ TF-P-000314709.

²⁰⁷ SMITHFIELD00456587 (Smithfield's Joe Weber (EVP of sales) writes [REDACTED]

2. Agri Stats Reports Allowed Monitoring of Output and Prices

104. The extraordinary breadth and scope of the Agri Stats reports allowed Defendants to precisely compare *plant specific* price, output, and cost data among themselves. The reports range from aggregate plant overviews to the minutia details of individual pork cuts and touched every step of the slaughtering processes. The Agri Stats reports contained all of the necessary information for Defendants to make precisely informed pricing and output decisions, and they allowed for participants to easily monitor each other's activities to detect cheating or deviation from any coordinated behavior. Below, I outline how the various reports could have been used to monitor current, firm and plant-specific output and prices, and then review evidence that they were in fact used for those purposes.

a. Agri Stats Reports Overview

105. Agri Stats' core product used by Defendants are its processing plant-level statistical reports. These reports allowed Defendants to compare their pork processing plant's performance—on a price, output, cost, yield, mix, or efficiency basis—to other Defendants' facilities. There are at least four reports relevant to pork processing facilities that would enable coordinated pricing: (1) a [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]²⁰⁸ These reports and other tools provided by Agri Stats enabled Defendants to monitor each other's product prices and outputs for individual products, as they compared the customer's individual plant and individual product prices and quantities to other participants in the program. As explained in Part II.B.c, the individual facilities, while nominally anonymized, were easily de-anonymized by Defendants. Even if de-anonymization were not possible, the sharing of this competitively sensitive information would still be anticompetitive given that Agri Stats itself knew the identities of each processing plant and could provide inducements to support collusion unilaterally.

106. In the following sections, I explain how the Agri Stats [REDACTED] reports can be used by Defendants to make informed pricing and output decisions, and how any Defendant receiving these Agri Stats report would have near perfect information on what their competitors were doing with respect to price, output, and profitability.

b. Agri Stats Reports That Monitored Prices

107. Industry participants must be able to monitor industry pricing for a cartel to function. Current and frequent information on pricing lets cartel participants know that fellow members are not undercutting them on price. Agri Stats gave pork processors a robust set of current pricing information in a disaggregated fashion, helped Defendants and their co-conspirators track current pork prices, and worked with them to raise pork prices.

²⁰⁸ Agri Stats also provides a [REDACTED]. See, e.g., AGSTAT-P-0002614319 at slide 7 [REDACTED] and at slides 10-11 [REDACTED]

108. During the Class Period, Agri Stats provided detailed and current pricing information to Defendants via the monthly Agri Stats [REDACTED]. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

A companion document titled [REDACTED]

[REDACTED] explains the purpose of each section and how each individual field within the report is calculated.²¹⁰ In general, [REDACTED]

[REDACTED]

²⁰⁹ See, e.g., AGSTAT-P-0002621880, a 2013 [REDACTED]
 [REDACTED] See also example Agri Stats plant reports for Smithfield from 2009:
 AGSTAT-P-0000323744 [REDACTED], AGSTAT-P-0000323746 [REDACTED]
 AGSTAT-P-0000323928 [REDACTED], AGSTAT-P-0000323668 [REDACTED]

[REDACTED] AGSTAT-P-0000323860 [REDACTED]

²¹⁰ AGSTAT-P-0002821515.

[REDACTED]. For example, Agri Stats writes that the reports in Section 1, titled

[REDACTED]

[REDACTED]

[REDACTED]²¹¹ Section 2, titled [REDACTED]

[REDACTED]

[REDACTED]²¹² Section 3, titled [REDACTED]

[REDACTED]²¹³ The final section, titled [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]²¹⁴

Here, the [REDACTED]

[REDACTED]

109. To understand how a Defendant could use this sales report to make pricing decisions, an example [REDACTED] is shown in Table 4 below.

This report, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

²¹¹ AGSTAT-P-0002821515 at -520.

²¹² AGSTAT-P-0002821515 at -528.

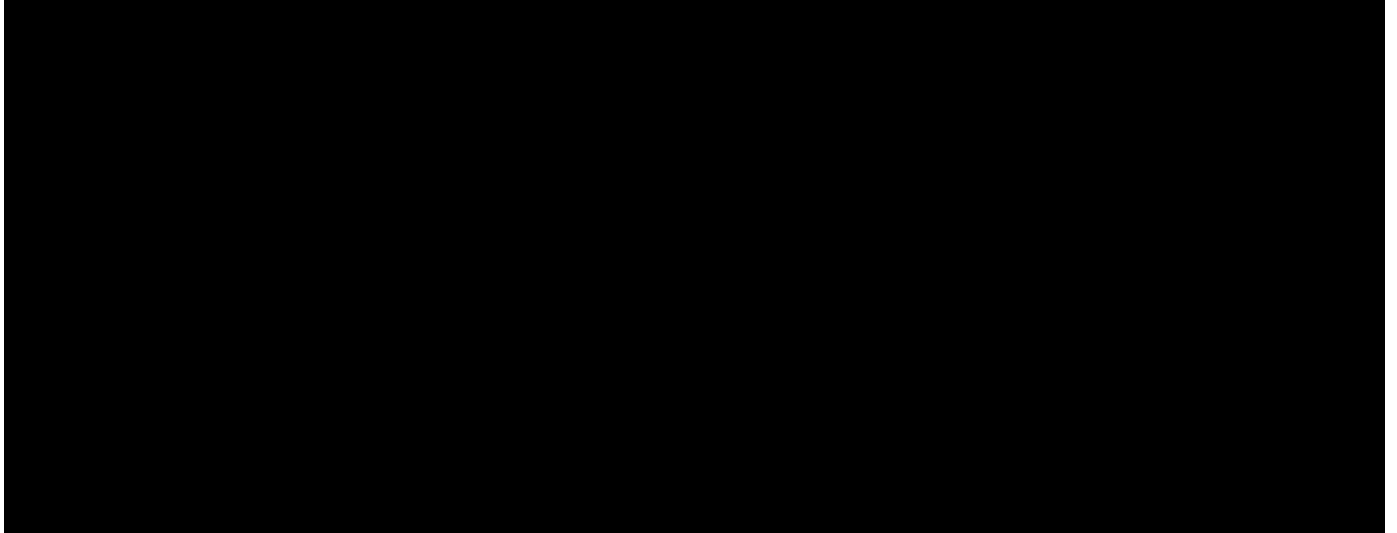
²¹³ AGSTAT-P-0002821515 at -533.

²¹⁴ AGSTAT-P-0002821515 at -535.

[REDACTED]²¹⁵ Agri Stats

explains that processing plants are [REDACTED]

[REDACTED]²¹⁶



The table above is broken into multiple sections. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

²¹⁵ AGSTAT-P-0000323746 at -750.

²¹⁶ AGSTAT-P-0002821515 at -520.

²¹⁷ *Id.*

[REDACTED]

[REDACTED]²¹⁸

110. Table 5 below focuses only on the upper left-hand side of the report: [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

²¹⁸ That is, if Smithfield produces slightly more of one product than its competitors, Agri Stats has weighted the competitors' data to reflect their prices *as if* they produced the exact same mixture of products as the Smithfield plants. AGSTAT-P-0002821515 at -520, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

111.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

112. [REDACTED]

[REDACTED]. Based on my review of the Agri Stats reports, I believe that every pork product in the class is represented in these Section 3 reports. For example, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

²¹⁹ AGSTAT-P-0002821515 at 524.

²²⁰ See Part III.B.1.d and Part III.B.3.

[REDACTED]

113. The Agri Stats “Bacon” and “Export Sales” reports follow a similar template to the Sales report.²²¹ [REDACTED]

[REDACTED]

114. In addition to these monthly Reports, Agri Stats provided weekly price data to Defendants in an online format called the “Sales Data Miner” online web tool. This online tool is a [REDACTED]

[REDACTED]²²² This tool allowed Agri Stats to [REDACTED]

²²¹ See, e.g., AGSTAT-P-0000874446, a March 2011 [REDACTED] report for Smithfield. See also SMITHFIELD00663930, an August 2013 [REDACTED] for Smithfield.

²²² TF-P-000304468, a 2012 email explaining the Agri Stats’ Data Miner Tool to Tyson Foods.

[REDACTED]²²³ In its sales pitch presentation, Agri Stats advertised how the Sales Data Miner could be used to identify a [REDACTED]

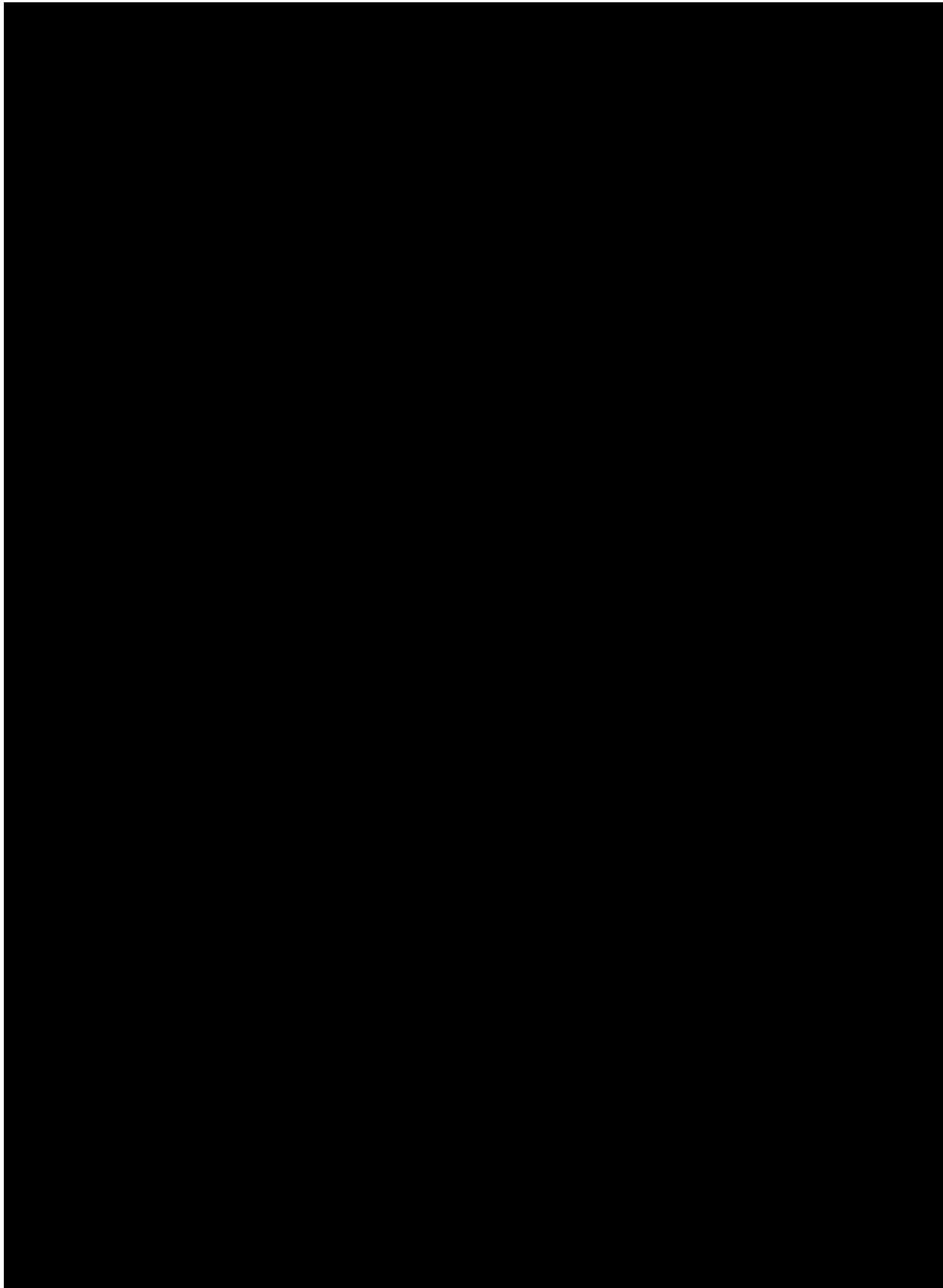
[REDACTED]

[REDACTED]²²⁴.

[REDACTED]

²²³ *Id.*

²²⁴ AGSTAT-P-0000019993 at slide 48, a 2008 Agri Stats Presentation to JBS.



115. Taken together, the Agri Stats Sales Reports showed how each Defendants' current prices compared to industry prices in extraordinary detail. Indeed, this level of detail allowed pork processors to verify that when they raised their prices (or sustain high prices), the rest of the industry would not undercut them. Because these reports are not available to the public, pork purchasers cannot use them to check whether they are being offered above-average prices (and, if so, bargain for a better deal).²²⁵

c. Agri Stats Reports That Monitored Output

116. As explained above in Section III.A, economic theory recognizes that for a cartel to be successful, participants must be able to monitor industry-wide output levels. When firms have a mechanism for gathering and disseminating reliable information about current industry output, they can assess whether their own output decisions are part of an industry-wide effort to limit supply and gauge whether that effort has been effective. Several regular Agri Stats reports helped Defendants with these tasks.

²²⁵ See, e.g., Edwards Dep. at 52:2-13:

See also *id.* at 53:7-13:

id. at 54:8-22:

See also

226

-86-



118. A companion document titled [REDACTED] [REDACTED] explains the purpose of each section and how each individual field within the report is calculated.²²⁷ Similar to the structure of the Sales reports, the Plant Reports begin at a highly aggregated level of cost data and then iteratively drill down into more and more granular levels of costs.

119. For example, an example Section 1.1 Plant report for Cargill is shown below. This report, at the most aggregated level of data, gives a broad view of how Cargill's

²²⁷ AGSTAT-P-0002614731.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

120. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

121. Because exports determine domestic pork availability, I consider also the supplemental [REDACTED]

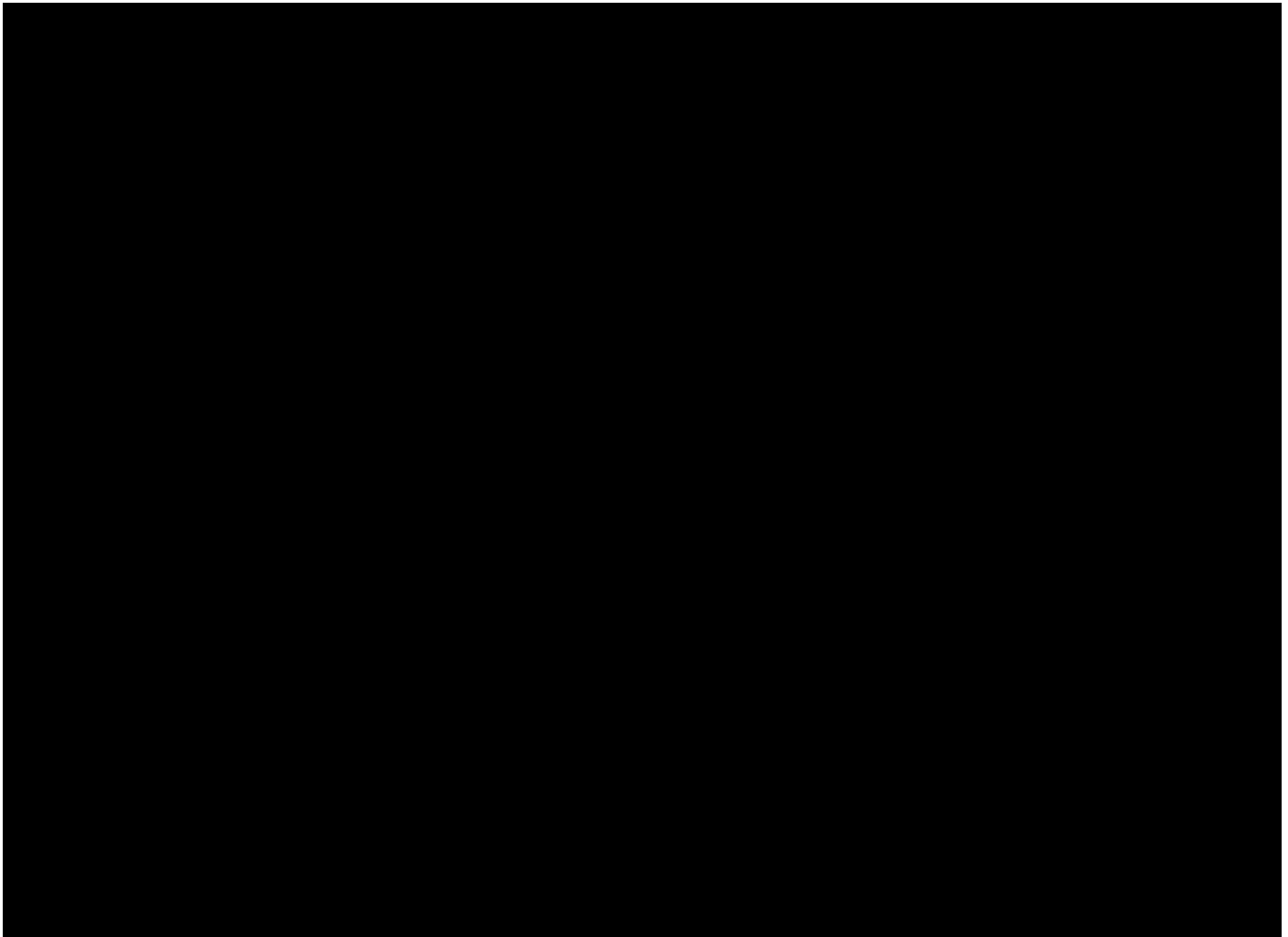
[REDACTED] 228

[REDACTED]

These reports allowed a firm to track its export share to each regional market on a product-by-product basis, in addition to allowing a firm to compare its prices to its competitors.

122. In addition to recent historical output information, Agri Stats also provides several “forecasts” of future swine supply, which help pork processors coalesce around strategies for keeping industry output low and prices high. For example, a 2014 JBS planning document shows that [REDACTED]

²²⁸ See, e.g., SMITHFIELD00663930, an August 2013 [REDACTED]
[REDACTED] report for Smithfield.



d. Defendants Used Agri Stats Reports to Make Pricing Decisions

123. Numerous Defendants circulated the Agri Stats reports containing competitively sensitive information on competitor prices to senior executives responsible for making pricing decisions. The evidence is consistent with the allegation that pork processors could trust and rely on the information they received from Agri Stats. To be clear, the value of the Agri Stats stems directly from the competitively sensitive information contained in the reports. This competitively sensitive information was unavailable to any individual Defendant outside of the Agri Stats reports.

124. There are many cases in the record evidence of Defendants citing the Agri Stats reports, which contained the sensitive competitor pricing information, as key financial and pricing tools. Defendant Clemens used Agri Stats pricing reports to outline their FY 2011 goals.²²⁹ These included increasing loin complex margin, expanding volume sold to most profitable customers, increasing forecast accuracy, and using Agri Stats as a price benchmark [REDACTED]

[REDACTED] The document notes that Agri Stats [REDACTED]

[REDACTED] In a June 17, 2013 email, Tyson Foods' Jason Brester (VP of Pork Procurement) commented that [REDACTED]²³¹

Tyson Foods' Deb McConnell (Controller at Tyson Fresh Meats) also emphasized, in an April 14, 2010 email that [REDACTED]

[REDACTED]²³² Cargill's James Russell expressed the same sentiment in an April 18, 2011 email regarding Agri Stat, noting its [REDACTED]

[REDACTED]²³³ In a November 2015 email, JBS' Lisa Peters sends a management team [REDACTED]

[REDACTED] and states she will [REDACTED]

²²⁹ CLMNS-0000036566 and CLMNS-0000036567, a March 2010 email and [REDACTED] document between Justin Schmerbeck, Joshua Rennells, George Wean, Victor Orn, Beth Siffel, Ralph Freed, and Randall Landis.

²³⁰ *Id.*

²³¹ TF-P-000986521.

²³² TF-P-000260279.

²³³ AGSTAT-P-0002819815.

[REDACTED]²³⁴ In a May 4, 2012 internal email, Tyson's Gary Machan explained that [REDACTED]

[REDACTED]²³⁵

125. Using the sensitive competitor price and output information, Agri Stats directly helped Defendants discern which products and customers were vulnerable to price hikes. In a 2009 memo titled [REDACTED] Agri Stats' Greg Billbrey advised that profitability, not increased output should serve as the economic lodestar: [REDACTED]

[REDACTED] Agri Stats systematic identification of [REDACTED] in the Sales Reports allowed Defendants to easily identify areas to raise their prices. In addition, as explained in Part II.B.3, Agri Stats would sometimes additionally call out specific pricing opportunities to Defendants who lagged behind in price, which served as an inducement to support collusion.

²³⁴ JBS-PORK-00010573 and JBS-PORK-00010574, an October 2015 email and Excel file sent from Lisa Peters to a dozen JBS recipients, including Martin Dooley, Ryan Andersland, Tim Uber, Jeff Greene, Mike McCarthy, Daniel Robinson, Jeff Pride Jr., Doug Jones, George Price, and Garry Albright. [REDACTED]

²³⁵ TF-P-000515626.

²³⁶ AGSTAT-P-0000000472 at -74.

126. The record evidence shows Defendants consistently using Agri Stats reports throughout the class period to raise below-average prices. Taking Smithfield as an example: Smithfield's SVP of Fresh Pork told his staff in a 2011 blast email to use Agri Stats reports to [REDACTED]

[REDACTED]²³⁷ A 2013 email from an employee at Smithfield's Farmland division used Agri Stats to identify [REDACTED]

[REDACTED]²³⁸ A 2015 email from the President of Smithfield's Fresh Pork Division stated that he challenged his business managers to use Agri Stats to [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]²³⁹ The document implies that Smithfield was able to monitor JBS's prices in particular.

²³⁷ SMITHFIELD01146638, a June 2011 email from Joe Weber.

²³⁸ SMITHFIELD01462721, an October 2013 email from Smithfield Farmland's Chris Venteicher.

²³⁹ SMITHFIELD00464013, an August 2015 email from Scott Sanders to Ken Sullivan re Agristats meetings.

127. Numerous other documents show executives and staff from all Defendants: Smithfield,²⁴⁰ Tyson,²⁴¹ JBS,²⁴² Clemens,²⁴³ Hormel,²⁴⁴ Seaboard,²⁴⁵ and Triumph²⁴⁶ all

²⁴⁰. See, e.g., SMITHFIELD00449132, a May 2016 Fresh Pork Division “SWOT” analysis which used Agri Stats to identify pricing opportunities. AGSTAT-P-0002796338 at slide 40, a 2017 Q2 Sales Review presentation showing Agri Stat pricing opportunities.

²⁴¹ See e.g., TF-P-002245589 and TF-P-002245590, a November 2010 email and [REDACTED] TF-P-000054715-16, a December 2011 email between Tyson execs using Agri Stats reports to identify [REDACTED] TF-P-000172958-9, a March 2012 Agri Stats Data Miner comparison created by Tyson, with a comment that it is [REDACTED] F-P-000220755, a June 2010 email from Tyson’s Debbie McConnell to other executives, [REDACTED]

²⁴² JBS-PORK-00035611, an August 2010 JBS email chain from the pork sales department which directly copies the Agri Stats Report [REDACTED] after the employee pastes the Agri Stat report, the manager responds, [REDACTED] JBS-PORK-00862294, a pricing opportunities spreadsheet made with Agri Stats data, with individual product price notes such as [REDACTED] JBS-PORK-00010573-4, an October 2015 email from a JBS analyst showing [REDACTED]

²⁴³ CLMNS-0000036566-7, a March 2010 email with Clemens’ Pork Fresh Team Goals for 2021, which include using Agri Stats as a benchmark, [REDACTED] CLMNS-0000023183, a January 2012 [REDACTED]

²⁴⁴ HFC-PORKAT0000266468, a December 2014 email showing Hormel’s initial setup for the Agri Stat Sales reports. HFC-PORKAT0000272374 and HFC-PORKAT0000272375, an April 2015 email including a November-January 2015 Agri Stat Quarterly Analysis for Hormel which includes numerous pricing opportunities.

using Agri Stats to identify opportunities to raise pork prices. Recall that these pricing opportunities were identified as the difference between a firm's price and the national average, or the 25th percentile of price. If all Agri Stats participants below the *average* price collectively raise their price to current average, the effect is to increase the average price for that product in the next period.²⁴⁷ The price increase is even more dramatic if participants all collectively raise their price to the 25th percentile: The 25th percentile essentially becomes the new average price in the next period.²⁴⁸ These mechanically coordinated price hikes would not have been possible without the Agri Stats reports, which gave up-to-date pricing and output information on every pork product.

128. Finally, Defendants' executives confirmed they did not use the reports to competitively lower prices or attempt to capture market share. For example, Mark Copa, VP

²⁴⁵ SBF0125496, an October-December 2014 [REDACTED] PowerPoint for Seaboard and Triumph with company prices compared to average and opportunities highlighted in yellow. SBF0088112 and SBF0088132, an April 2015 email from a Seaboard product manager which attaches [REDACTED]

[REDACTED] SBF0120979, a May 2018 email from a Seaboard employee showing use of the Data Miner and matching customer names to the Agri Stat weekly reports.

²⁴⁶ SBF0125496, *supra*. TRI0000052479, a May 2015 email showing a Triumph senior vice president incorporating an Agri Stat report into a Seaboard-Triumph analysis. TRI0000037014, a 2015 Q1 Triumph Foods presentation titled [REDACTED]

²⁴⁷ For example: in a three-firm example with prices of \$1, \$2, and \$3, the average price is \$2. If the lowest priced firm raises to \$2, the prices in the next period are \$2, \$2, and \$3, or a new average of \$2.33. If this process repeats, the two lowest firms (\$2) both raise their price to the average of \$2.33, so prices in the next period are \$2.33, \$2.33, and \$3, with a new average price of 2.55.

²⁴⁸ For example: In a four-firm example with prices of \$1, \$2, \$3, and \$4, the 25th percentile price is ~\$3 and the average price is 2.5. If the firms below that threshold raise their prices to \$3, the prices in the next period are \$3, \$3, \$3, and \$4, and the new average price is 3.25.

of Financial Planning and Analysis at Smithfield, testified at his deposition that the Agri Stats pricing data [REDACTED]

[REDACTED]²⁴⁹

e. Defendants Understood That Domestic Supply Restrictions Would Raise Domestic Prices

129. Before moving to the evidence that Defendants used the Agri Stats data to reduce domestic supply, it is important to establish that Defendants recognized that a collective reduction of domestic pork supply increases domestic pork prices. Defendants routinely tracked the relationship between price and total domestic pork “disappearance”—that is, the amount of pork available for consumption in a market.²⁵⁰ This foundational evidence shows that Defendants correctly believed that removing or suppress domestic supply would directly translate into higher price.

²⁴⁹ Deposition of Mark Copa (Jan. 27, 2022) at 106:2-11 [REDACTED]

²⁵⁰ “Disappearance” equals pork production, net of imports and exports, minus changes in frozen inventory stock. *See, e.g.,* Institute of Medicine and National Research Council. *Data and Research to Improve the U.S. Food Availability System and Estimates of Food Loss: A Workshop Summary*, 2015, THE NATIONAL ACADEMIES PRESS, Appendix A: Glossary and Acronyms, *available at* <https://www.nap.edu/read/18978/chapter/9#143>. *See also* TF-P-002004195, a 12/9/2013 email between Jim Gore and Steve Stouffer, Randall Chambers, Shane Miller, Jerry Pfeifer, Jerry Holbrook, Kevin Hueser, Gary Machan, Todd Neff, and James Lochner. The USDA is careful to note that this figure is not a direct measure of actual consumption nor of the quantity ingested, but rather a measure of pork that “disappears” in a food market over a given time period. *See* Economic Research Service, *Food Consumption, Prices, and Expenditures, 1970-97*, “The Data” Appendix, U.S. DEPARTMENT OF AGRICULTURE, *available at* https://www.ers.usda.gov/webdocs/publications/47097/14798_sb965b_1.pdf?v=0.

130. A 2013 email from Tyson's Jim Gore to an internal management team attaches an [REDACTED]

[REDACTED] earance.²⁵¹ The email reads:

[REDACTED]
[REDACTED]²⁵²

One such chart, reproduced as Figure 12 below, [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]

²⁵¹ TF-P-002004195 and TF-P-002004196.

²⁵² *Id.* (emphasis added).

[REDACTED]

131. Other evidence shows that Tyson paid close attention to the domestic availability of pork products as it influenced prices. Tyson maintained a [REDACTED]

[REDACTED]

[REDACTED]²⁵³ Tyson was interested in tracking domestic pork availability because it had a direct impact on price and profitability. For example, in an April 2015 email, one Tyson employee wrote that the [REDACTED]

[REDACTED] in pork loins [REDACTED]

²⁵³ TF-P-001063041 and TF-P-001063042.

²⁵⁴ His counterpart responds: [REDACTED]

[REDACTED]²⁵⁵

132. Smithfield also understood that reducing domestic supply would inflate prices. A 2015 internal presentation from Smithfield's Chief Strategy Officer stated that the company [REDACTED]

[REDACTED]²⁵⁶ A similar 2016 internal email from Smithfield's Chief Strategy Officer explained how the company [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

²⁵⁴ TF-P-001007930, a May 2015 email between Tyson employees Jessie Phipps, Steve Billups, Jay Krehbiel, and Shane Miller. *See also id.* [REDACTED]

[REDACTED] (emphasis added).

²⁵⁵ *Id.*

²⁵⁶ SMITHFIELD01095550 and SMITHFIELD01095551 at -552, an April 2015 email regarding an upcoming presentation to Chairman Wan.

²⁵⁷ SMITHFIELD001172684, a March 2016 email between Smithfield's Dhamu Thamodaran and Glenn Nunziata.

Later that year, Smithfield proposed an aggressive export budget and target for China. One Smithfield employee comments that [REDACTED]

[REDACTED]²⁵⁸

133. Other Defendants reached the same conclusion. A 2015 industry overview document circulated among Clemens's employees noted that [REDACTED]

[REDACTED]²⁵⁹ The document further noted that [REDACTED]

[REDACTED]²⁶⁰ A 2016 [REDACTED]

[REDACTED] report prepared by the consulting group Steiner and Company for Hormel similarly pointed to the relationship of supply and demand: [REDACTED]

[REDACTED]²⁶¹ Another consulting document noted that pork producers had been able to artificially inflate prices by collectively lowering domestic output.²⁶²

²⁵⁸ SMITHFIELD00705612, a December 2015 email discussing the 2016 Export Budget for China between Jason Richter, Ken Sullivan, Dhamu Thamodaran.

²⁵⁹ CLMNS-0000298048, a February 2015 Draft Q3 Industry Overview emailed between Clemens' Kevin Kratz, Daniel Groff, and Ronald Freed.

²⁶⁰ *Id.*

²⁶¹ HFC-PORKAT0000115867 at -869, a February 2016 report retained by Hormel.

²⁶² KERNS00008887 at -897, a 2016 article by Kerns and Associates, titled [REDACTED]

[REDACTED] states [REDACTED]

f. Defendants Used Agri Stats Reports to Make Export Decisions to Reduce Domestic Supply

134. The record evidence shows that Defendants similarly used the Agri Stats reports to make export decisions, which as shown above, is economically akin to making production decisions for the U.S. domestic pork market.

135. Some evidence shows that Defendants used Agri Stat to make export decisions. For example, Tyson's Gary Machan (SVP Pork Margin Management) wrote in an internal June 2012 email that [REDACTED]

[REDACTED]²⁶³ Similarly, when Agri Stats proposed making a change to the Export Report which may have censored some information, Cargill's Norman Bessac (Global Pork Director) commented that [REDACTED]

[REDACTED]²⁶⁴ Other evidence shows the Agri Stat Export data being used in regular course of business analyses at Smithfield²⁶⁵ and Tyson.²⁶⁶

²⁶³ TF-P-000527381.

²⁶⁴ AGSTAT-P-0002621454-5.

²⁶⁵ SMITHFIELD00664153, a November 2013 email from Smithfield's Mark Copa (VP Financial Planning) showing Agri Stat exports and containing the Export report.

²⁶⁶ TF-P-000210990, a January 2010 email from Tyson's Deb McConnell stating [REDACTED] and attaching an Agri Stats analysis containing deanonymized data. One of the document tabs, [REDACTED], shows [REDACTED]

[REDACTED] TF-P-000275993 and TF-P-000275994, a January 2011 email from Tyson's Shane Miller (Vice President of the Fresh Meats Team) regarding an internal analysis [REDACTED]

[REDACTED] TF-P-000101143 and TF-P-000101144, a March 2013 email from Tyson's Deb McConnell to an internal working group, containing Agri Stat export data and a note that [REDACTED]

3. Agri Stats Organized Defendants into a Cohesive Economic Entity

136. From an economic standpoint, Agri Stats core business model was to act as a third-party facilitator of price and output coordination. As noted in Part I.C, Agri Stats enabled Defendants to coordinate on price and output by serving as the facilitator of sensitive information sharing. Agri Stats had unfettered access to Defendants' current granular price, cost, and output data, audited that data to ensure its comparability to other Defendants, and then circulated the competitively sensitive information for a nominal fee. The collection and dissemination of the competitively sensitive information reviewed in Part II.B.1 is the core day-to-day work of a cartel. In other words, the standard operations of Agri Stats are the same standard operations of a cartel, as described by Levenstein and Suslow in Part III.A.2.

137. Two additional types of evidence suggest that Agri Stats' day-to-day activities facilitated conduct that was consistent with collusion and not consistent with competition. *First*, Defendants within the Agri Stats program actively solicited Agri Stats to sign up processors not yet participating in Agri Stats, or to expand the scope of data collection among competitors. While it is rational to expect Agri Stats to seek expansion for its own revenue, the fact that *member processors* sought expansion shows that *they* expected to profit from expanding the program—a clear indicator of a cartel. *Second*, Defendants worked with Agri Stats to produce even more detailed, timely data as the information-sharing ring evolved. I discuss the evidence below.

a. Defendants Pushed Agri Stats to Sign Up Additional Processors

138. Defendants understood that the strength of the cartel depended on industry-wide participation. One Tyson executive wrote in May 2012 that Tyson's participation in the

Agri Stat Data Miner program would benefit the industry: [REDACTED]

[REDACTED]²⁶⁷ Such a statement shows that Tyson would take actions to benefit its rivals.

139. Key Defendants repeatedly encouraged Agri Stats to sign up other Defendants or to expand their collection program, which is a clear indication that they expected to profit from greater participation. In 2012, one Tyson executive told an Agri Stats employee to

[REDACTED]²⁶⁸ A similar 2013 email from Tyson's then-president of the Fresh Meats division, Noel White, admonished Agri Stats for failing to sign up other Defendants:

[REDACTED]²⁶⁹ Similarly, an internal Agri Stats email in 2015 discussing the Bacon Reports reads [REDACTED]

[REDACTED]²⁷⁰ Agri Stats promised its customers that [REDACTED]

[REDACTED]²⁷¹

²⁶⁷ TF-P-000515626-7, a May 2012 email from Tyson's Gary Machan (SVP Pork Margin Management).

²⁶⁸ TF-P-000318770; TF-P-000466138 (an October 2012 email from Tyson's Deb McConnel to Agri Stats' Josh Edwards) (emphasis original).

²⁶⁹ TF-P-000535395.

²⁷⁰ AGSTAT-P-0002612911 at -12.

²⁷¹ TF-P-000535395.

b. Agri Stats Worked With Defendants To Refine and Expand Confidential Information Sharing

140. Defendants worked with Agri Stats to create new types of reports and provide more current data. Record evidence shows that Smithfield and [REDACTED] encouraged Agri Stats to create an Export Sales report. In an April 2014 email, Agri Stats' Josh Edwards emails Smithfield's Mark Copa that the [REDACTED]

[REDACTED] Asking for a discount on the fee, Copa comments [REDACTED]

to which Edwards replies [REDACTED]

[REDACTED]²⁷³ Other evidence shows that this process was ongoing: In an internal December 2014 task list email between Agri Stats employees, they note [REDACTED]

[REDACTED]²⁷⁴ Similarly, Defendants also worked with Agri Stats to improve the timeliness of the data. In an April 2008 email Cargill's Randy Carlgren emails Agri Stats' Brian Snyder that the [REDACTED]

²⁷² SMITHFIELD00663101 [REDACTED]

²⁷³ *Id.*

²⁷⁴ AGSTAT-P-0002620767.

[REDACTED]²⁷⁵ Snyder pledges to [REDACTED]

[REDACTED]²⁷⁶

4. Agri Stats Provided Inducements to Support Collusion

141. In addition to facilitating the sharing of competitively sensitive information, Agri Stats also actively reached out to Defendants to identify “pricing opportunities” that were not being realized. From an economic lens, this active opportunity identification (as opposed to passively allowing Defendants to find their own opportunities in the data) serves as an inducement to keep the price coordination functioning by simultaneously encouraging members to raise their prices. For example, in a report to Smithfield titled [REDACTED]

[REDACTED] Based on information from January-September 2016, the report identified a [REDACTED]

[REDACTED] and a [REDACTED]

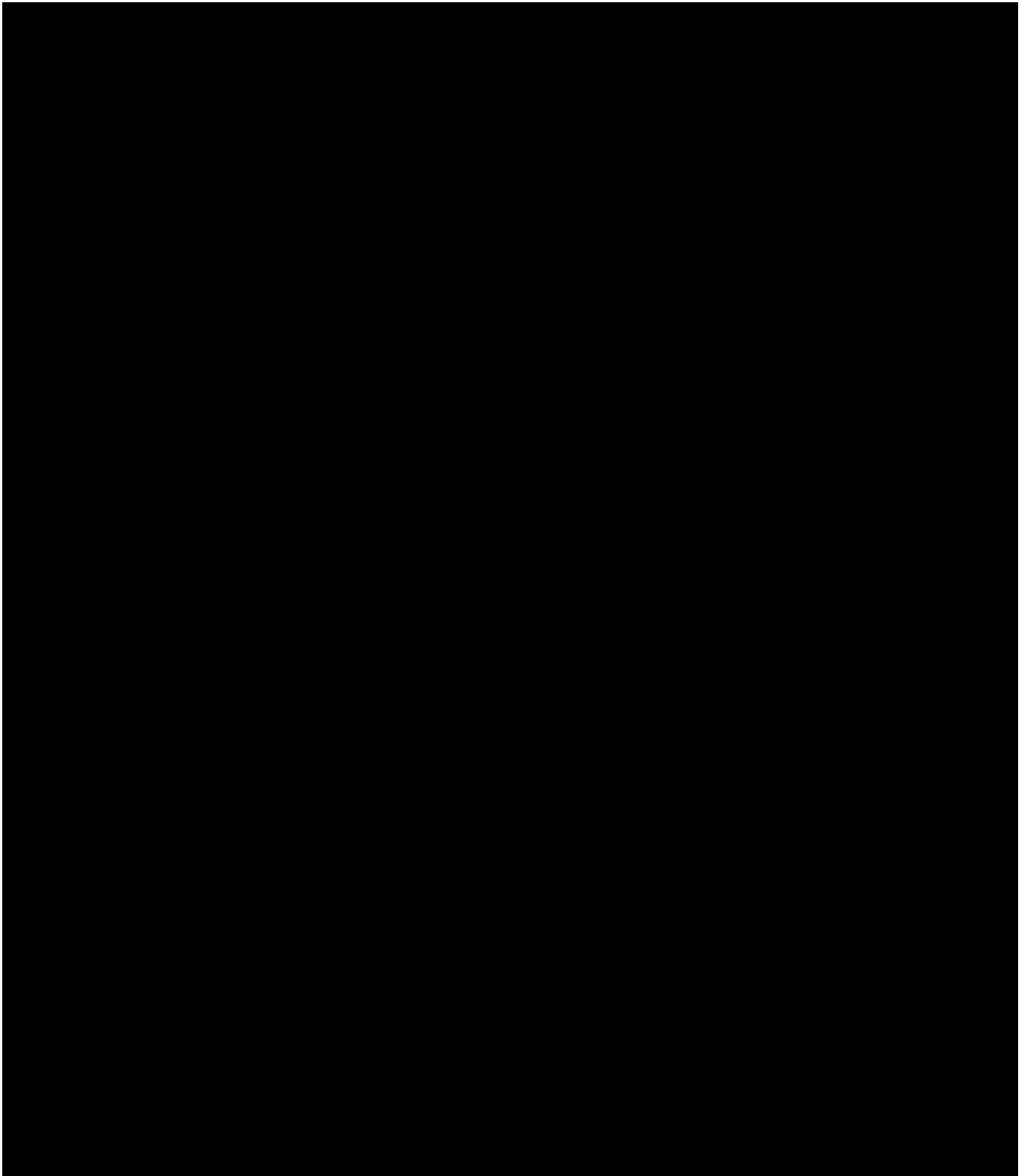
[REDACTED]²⁷⁸

²⁷⁵ AGSTAT-P-0002872912.

²⁷⁶ *Id.*

²⁷⁷ SMITHFIELD01003515.

²⁷⁸ *Id.* at -518 (emphasis original).



142. The record evidence shows that Agri Stats identified “pricing opportunities” to the Defendants. For example, in a similar courting email, Agri Stats’ Matt McNeal (Account Manager) identified three “opportunities” in a 2017 email to Hormel, noting that:

[REDACTED]

In a 2009 email that included May Agri Stats data, Tyson’s Deb McConnell explained that, based on Agri Stats data, [REDACTED]

[REDACTED]²⁷⁹ Likewise, a 2012 Seaboard Foods internal email noted that the company relied on information from Agri Stats to potentially artificially inflate prices: [REDACTED]

[REDACTED]

[REDACTED]²⁸⁰ In a 2008 email, Triumph Foods’ Rick Hoffman wrote Seaboard’s Rod Brenneman that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

²⁷⁹ AGSTAT-P-0002818513; AGSTAT-P-0002818528.

²⁸⁰ TF-P-000096312.

²⁸¹ SBF0312990. *See also* SBF0125625, a Sales Report spreadsheet titled: [REDACTED] whose custodian was Seaboard’s Damon Ginther (Senior Director of Business Data and Analytics / Director of Process Improvement and Analysis). The document was created 11/19/2010 and last modified on 1/15/2013. [REDACTED]

[REDACTED]. *Also see* SBF0125785, a [REDACTED] The document was created 11/19/2010, last modified on 4/10/2013, and contains [REDACTED]

[REDACTED]²⁸² An internal Hormel document titled [REDACTED]
 [REDACTED]
 [REDACTED] In a 2013 email, Smithfield's Joseph Luter
 commented to Smithfield's Mark Copa regarding information from Agri Stats' Josh Edwards
 that [REDACTED]²⁸⁴

143. Identification of opportunities for price increases, not available to individual
 Defendants via their own, more limited, information sets, appears to have been an
 inducement for using Agri Stats' services. For example, in a 2009 email, Tyson's Deb
 McConnell told Agri Stats' Jeff Edwards that, [REDACTED]

[REDACTED] In another October 2017 example, Agri Stats
 used its [REDACTED]

[REDACTED]. Agri Stats' Matt McNeal (Account
 Manager) included an example sales report to Hormel's Paul Peil, and explained that [REDACTED]
 [REDACTED]²⁸⁶ Peil then forwarded the report
 internally at Hormel, observing:

[REDACTED]

²⁸² SBF0149705.

²⁸³ HFC-PORKAT0000272381.

²⁸⁴ SMITHFIELD00663101.

²⁸⁵ AGSTAT-P-0000019661.

²⁸⁶ HFC-PORKAT0000022976.

[REDACTED] 287

According to Agri Stats fee records, [REDACTED]

[REDACTED] 288

IV. ECONOMETRIC ANALYSIS OF QUANTITATIVE EVIDENCE OF COLLUSION

144. In this section, I demonstrate that the quantitative evidence common to the Class can be used to show that the Challenged Conduct inflated prices over competitive levels. I present an econometric model designed to isolate the price effects (overcharge) owing to the Challenged Conduct, holding constant other key supply and demand factors that could influence price. Following standard frameworks from economics and antitrust, my analysis proceeds by comparing the prices paid by Direct Purchasers during the Class Period, during which the Challenged Conduct was allegedly in effect, to a Benchmark Period in which the Challenged Conduct was either diminished or non-existent.²⁸⁹ Using standard multiple-regression techniques, I control for factors other than the Challenged Conduct itself

²⁸⁷ *Id.*

²⁸⁸ See Appendix 3.

²⁸⁹ Theon van Dijk and Frank Verboven, *Quantification of Damages*, in 3 ISSUES IN COMPETITION LAW AND POLICY 2331, ABA Section of Antitrust Law (2008) [hereafter, Dijk and Verboven (2008)] at 2335 (“The before-and-after method. In this method the prices that prevailed before and after the collusive period are used to estimate the prices that would have emerged during the collusive period had the collusion not taken place. To the extent that cartel prices differ in a statistically significant way from the pre- and postcartel prices, it may be possible to attribute the difference to collusion. The before-and-after approach is usually implemented within a multiple regression framework in which one estimates the price over the entire period (conspiracy and benchmark period) and includes an indicator (or “dummy”) variable that is equal to one during the conspiracy period and zero otherwise. The estimated coefficient associated with this dummy variable then measures the amount of the price overcharge.”) See also ABA PROOF OF CONSPIRACY, *supra*, at 224-230.

that might influence prices.²⁹⁰ This allows me to test the “null hypothesis” that the Challenged Conduct did not inflate prices beyond what can be explained by competitive factors.²⁹¹ As explained below, my econometric analysis decisively rejects the null hypothesis.

A. Econometric Analysis Demonstrates That the Impact of the Challenged Conduct on Prices Across Nearly All Types of Pork Is Economically and Statistically Significant

145. The beginning of the Challenged Conduct on or around January 2009, combined with highly granular sales data from each Defendant before and after January 2009, allows me to analyze what economists term a “natural experiment,” defined as “[a] naturally occurring instance of observable phenomena that yield data that approximate a controlled experiment.”²⁹² I use econometric methods, which are standard statistical techniques for “estimating economic relationships, testing economic theories, and evaluating and implementing government and business policy.”²⁹³ The Federal Judicial Center’s

²⁹⁰ See, e.g., JEFFREY M. WOOLDRIDGE, *INTRODUCTORY ECONOMETRICS: A MODERN APPROACH* (South-Western 2009 4th ed.) [hereafter, WOOLDRIDGE] at 68 (“Multiple regression analysis is more amenable to *ceteris paribus* analysis because it allows us to *explicitly control* for many other factors that simultaneously affect the dependent variable.”) (emphasis original).

²⁹¹ *Id.* at 121-123.

²⁹² Daniel L. Rubinfeld, *Reference Guide on Multiple Regression*, *REFERENCE MANUAL ON SCIENTIFIC EVIDENCE* 305, 335 (3rd ed. National Academies Press 2011) [hereafter *REFERENCE MANUAL*].

²⁹³ WOOLDRIDGE at 1. As such, econometric methods are widely used by economists and other analysts in academia, government, and private businesses. R. CARTER HILL, WILLIAM E. GRIFFITHS, & GUAY C. LIM, *PRINCIPLES OF ECONOMETRICS 1* (John Wiley & Sons 5th ed. 2018) [hereafter Hill et. al.] (“The importance of econometrics extends far beyond the discipline of economics.

Reference Manual on Scientific Evidence explains that multiple regression analysis (the standard econometric tool for analyzing relationships between variables, which I employ here) is “a well-accepted scientific methodology.”²⁹⁴ A key advantage of multiple regression analysis is that it allows one to rigorously analyze the effect of one variable on another—here, the Challenged Conduct on Defendants’ wholesale pork prices—while controlling for other variables that influence wholesale pork prices. In this way, multiple regression analysis “distinguishes among a number of competing factors... allowing the court to isolate a key relationship...”²⁹⁵ Notably the *Reference Manual* does not endorse running separate regressions for each customer; instead, the data are pooled across customers to maximize the efficiency and explanatory power of the model.

146. When testing for the effects of alleged anticompetitive conduct in an antitrust context, it is standard practice in economics to employ an econometric model that compares

Econometrics is a set of research tools also employed in the business disciplines of accounting, finance, marketing, and management. It is also used by social scientists, specifically researchers in history, political science, and sociology. Econometrics plays an important role in such diverse fields as forestry, and in agricultural economics... Thus research methods employed by economists, which comprise the field of econometrics, are useful to a broad spectrum of individuals.”). *See also* R. CARTER HILL ET. AL, *PRINCIPLES OF ECONOMETRICS 1* (John Wiley & Sons, 4th Edition, 2011) (“Econometrics is a set of research tools also employed in the business disciplines of accounting, finance, marketing and management. It is used by social scientists, specifically researchers in history, political science, and sociology.”).

²⁹⁴ *REFERENCE MANUAL* at 308 (“Because multiple regression is a well-accepted scientific methodology, courts have frequently admitted testimony based on multiple regression studies[.]”).

²⁹⁵ Johnathan Baker & Daniel Rubinfeld, *Empirical Methods in Antitrust Litigation: Review and Critique*, 1 *AMERICAN LAW AND ECONOMICS REVIEW* 386-435, 388 (1999) [hereafter, Baker & Rubinfeld] (“Empirical methods can help courts identify what happened and why. This can often be accomplished through a multiple regression analysis that distinguishes among a number of competing factors that were correlated with a fact pattern - allowing the court to isolate a key relationship or critical influence using models that describe the statistical relationship between one variable and a number of others.”).

prices during a time period in which the conspiracy is alleged to have occurred with prices in a benchmark period in which the alleged conspiracy or restraint was absent, holding constant other factors that may affect prices.²⁹⁶ Accordingly, I have developed an econometric model to compare (1) the prices charged to Direct Purchasers when the Challenged Conduct was in effect to (2) the Prices charged to Direct Purchasers before the Challenged Conduct, while controlling for other factors that might explain movements in pork wholesale prices. Following standard methods, I run a single regression for all customers at once.

1. Regression Using Defendants' Sales Data

147. In discovery for this matter, Defendants were requested to produce their structured sales data of all pork products from January 1st, 2005 through December 31,

²⁹⁶ See, e.g., Baker & Rubinfeld, *supra*, at 392 (“Reduced form equations are perhaps the most commonly employed in price-fixing cases. In this litigation setting, the goal is typically to determine whether and how much prices rose as a result of the alleged cartel...The price effect of the alleged conspiracy is measured by the coefficient on a dummy variable that takes on the value of one during the period (or in the markets) in which the conspiracy is in operation.”). The American Bar Association’s treatise offers similar guidance. See also ABA SECTION OF ANTITRUST LAW, PROVING ANTITRUST DAMAGES 180 (3d ed. 2017) (“The dummy variable model uses data from both the alleged conspiracy period and the non-conspiracy period to estimate the relationship between price, economic factors, and a dummy variable for the alleged conspiracy period, with the dummy variable measuring how much higher prices were in the alleged conspiracy period relative to the non-conspiracy period, after controlling for the other economic factors.”). See also ABA Proof of Conspiracy, n. 39 (“One way to estimate such a model would be to use the price of the product in question as the dependent variable, while using measurements of relevant demand and supply factors as explanatory variables, including a dummy variable that takes a value of one during the class period and zero otherwise. This dummy variable would capture the price inflation if any, during the class period after controlling for the effect of all the other demand and supply factors.”).

2020.²⁹⁷ The inclusion of data prior to January 2009 is essential for the regression analysis to have a “clean” or benchmark period with which to compare prices during the Conduct Period. Of the seven Defendant Processors in this case, six produced pre-2009 data, as summarized in Table 10 below. Defendant Clemens stated it could not produce data prior to May 2010 due to a system crash and inability to use its backup data system.²⁹⁸ This means that Defendant Clemens’ data cannot directly inform the pre-Conduct Period prices, but will still contribute to informing the Conduct Period prices in a model without Defendant-specific fixed effects. (I run the model both with and without Defendant-specific fixed effects.) Furthermore, Defendant Smithfield only supplied a small amount of sales data prior to 2008, claiming that prior data either no longer existed.²⁹⁹ Nevertheless, as explained below the data that was provided by Smithfield still show evidence of an overcharge. Note that Seaboard and Triumph jointly produced their sales data, and I understand that [REDACTED]

[REDACTED]³⁰⁰ I treat Seaboard and Triumph as a single processor for the

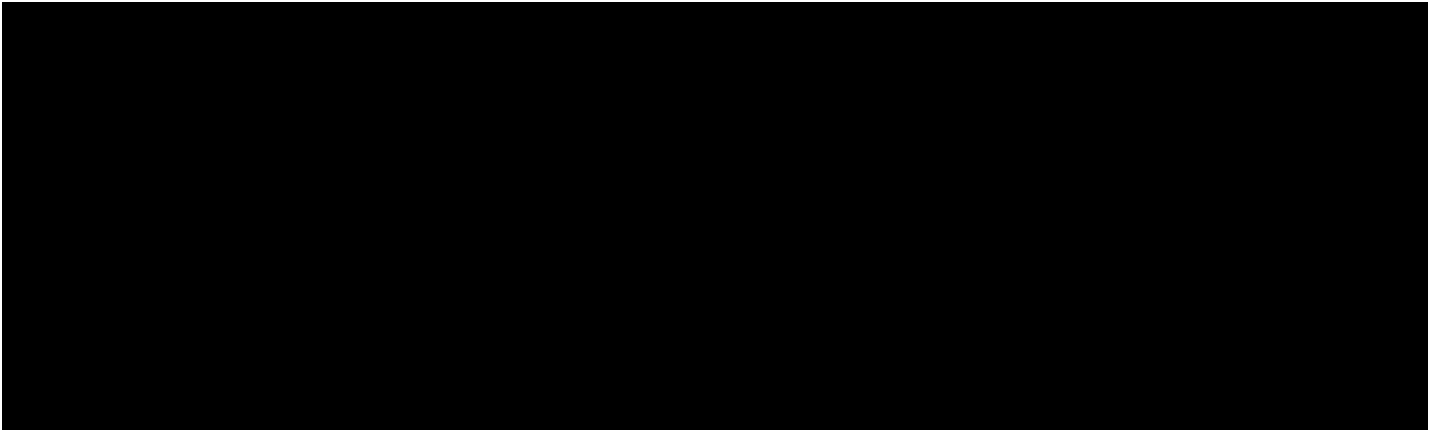
²⁹⁷ Defendants continued to produce structured sales data up to one business day before this report’s filing. Lacking sufficient time to clean and processes this data, some later productions were not incorporated into the final regression dataset. Further, I understand that JBS and Seaboard omitted the production of certain bacon sales (JBS’s bacon sales to Plumrose; Seaboards post 2014 bacon sales under Daily’s Premium Meats). I reserve the right to amend or revise my regression modeling in later reports after reviewing and incorporating any new data.

²⁹⁸ Letter from Christina L. Briesacher, Kirkland & Ellis LLP, “Clemens’ Discovery Responses and Structured Data” (March 18, 2021) (“Clemens does not have any responsive structured sales data prior to May 2010. The system used by Clemens prior to Protean, referred to as Legacy, crashed and the hardware used to run the system was damaged. Clemens does maintain backup tapes associated with the Legacy system, but does not have any ability to load the back up tapes. Clemens further does not know whether any data even exists on the backup tapes, or if it does, whether the data has been corrupted or damaged.”).

²⁹⁹ Email from Brian E. Robison, Gibson Dunn, “Pork – Smithfield’s Structured Data Production” (May 25, 2021).

³⁰⁰ Deposition of Damon Ginther, (Dec. 7, 2021), at 266:3-8.

purposes of the regression model, although the results of the regression model are not sensitive to treating them as separate entities.



148. The individual Defendants' sales data was cleaned and processed into a single unified sales database.³⁰¹ The final database contains monthly sales of individual Class Pork Products from each of Defendants' facilities to a unique Direct Purchaser from April 2004 through December 2020.³⁰² I limit the data to the "Retail/Supermarket," "Distributor," "Further Processing," and "Trader/Broker" customer types, as these sales channels could potentially reach a Class Member. I further exclude pork products that fall outside of the Class Pork Product definition, meaning that the final dataset only contains bacon, bellies, ribs, loins, shoulder, and pork chops. Any products marketed as organic, no-antibiotics-ever, or are pre-cooked are excluded, as are any products (other than bacon) that are marinated, seasoned, flavored, cooked, or breaded.

³⁰¹ The sales data used in the regression are limited to initial sales with positive unit quantities and prices.

³⁰² If a customer made two purchases of the same product from the same processing plant on the same month, those transactions are combined.

149. I test the hypothesis that, holding other factors constant, Defendants' actions resulted in increased Class Pork Product prices (measured as their wholesale price per pound) during the Conduct Period, defined as January 2009 through December 31, 2020. I employ multivariate regression models in which the dependent variable to be explained is the average price of a particular pork product, from a particular Defendant to a particular customer, in a given month of data. The key independent variable of interest ("Conduct") captures the effect of the Challenged Conduct, holding constant other factors that may affect pork prices. The regression equation can be written as follows:

$$\ln(\text{Price}_{hijt}) = \beta_0 + \beta_1 \text{Conduct}_t + \sum_k \lambda_k X_{hijt}^k + \varepsilon_{hijt}$$

The regression equation can be divided into three main components: (1) the *dependent* variable ($\ln(\text{Price}_{hijt})$), which measures the price of individual Class Pork Product; (2) the key *independent* variable (Conduct_t); (3) the *control* variables (X_{hijt}^k), which collectively control for other factors (aside from the Conduct) that may influence pork product prices; and (4) an error term (ε_{hijt}). I describe each component below. (In addition, the regression variables are listed in Table 11 below).

150. First, $\ln(\text{Price}_{hijt})$ is the dependent variable of the regression model; Price_{hijt} is the weighted average price each Direct Purchaser h paid Pork Processor i for product j at time t . It is standard to use natural logarithms (ln) for continuous variable in

econometrics.³⁰³ This also allows the regression coefficients to be interpreted in percentage terms.

151. *Second*, the key variable of interest, $Conduct_t$, measures variation in the Challenged Conduct over time. Specifically, $Conduct_t$ is an indicator variable equal to zero before the start of the Challenged Conduct, and one during the Challenged Conduct, defined as January 2009 to June 2018. In the equation above, the percentage change in price associated with the Challenged Conduct is given by β_1 . (Note that β_0 is the intercept of the regression equation). If the percentage change given by β_1 is positive, this implies the Challenged Conduct is associated with an increase in pork prices, holding other factors constant. If the coefficient is statistically significant, then we can reject the null hypothesis of there being no effect of the Conduct on prices.

152. *Third*, the symbol X_{hijt}^k denotes the various *control* variables k in the model, which account for other demand-side and supply-side factors that could affect pork prices across time. By holding other factors fixed, the regression is able to isolate the impact of the Challenged Conduct on prices.³⁰⁴ Note however that economists recognize that it is not possible to literally hold all else equal, nor is it desirable for a model to perfectly explain changes in the dependent variable for fear of “overfitting” a model.³⁰⁵ Rather, the objective

³⁰³ See, e.g., WOOLDRIDGE Chapter 6.2.

³⁰⁴ See, e.g., WOOLDRIDGE at 12 (“The notion of *ceteris paribus*—which means ‘other (relevant) factors being equal’— plays an important role in causal analysis... If other factors are not held fixed, then we cannot know the causal effect of a [independent variable] on [a dependent variable].”).

³⁰⁵ *Id.* (“[E]xcept in very special cases, it will not be possible to literally hold all else equal. The key question in most empirical studies is: Have enough other factors been held fixed to make a case for causality?”).

is to control for sufficient factors so that we can clearly estimate relationship between the key independent variable (Conduct) and the dependent variable (pork prices).³⁰⁶ This is why multiple economists studying the same problem may come up with multiple, all empirically valid regression models: The objective is not to perfectly explain all movements in pork prices, but rather to isolate the effect on price of a single variable of interest (Conduct). Put differently, all regression models omit some important variables. But only omitted variables that are correlated with both the dependent variable (pork prices) and at least one independent variable will engender bias in the regression coefficients.³⁰⁷ I have included both supply and demand controls in my regression analysis. I explain each below.

153. I select three variables to model how Defendants' input costs to pork products may have changed over time. *First*, I control for the cost of the pig itself. I use data compiled by Iowa State University that reports, on a monthly basis, the average cost of producing a 270-pound finished pig. These data account for the changing costs of animal feed (composed of ingredients such as the cost of corn and soybean meal), as well as nonfeed costs (variable and fixed) across time for a "rank-and-file Iowa producer."³⁰⁸ Although not all of Defendants' pigs come from Iowa, data from the USDA shows that nationwide pig prices

³⁰⁶ In econometric terms, we add in controls until we are satisfied that the key independent variable Conduct is exogenous, or uncorrelated with the error term (the unexplained variation in price). See WOOLDRIDGE at 87-88.

³⁰⁷ See Kevin Caves & Hal Singer, *Applied Econometrics: When Can an Omitted Variable Invalidate a Regression?*, ANTITRUST SOURCE (2017).

³⁰⁸ I use the "Estimated Returns – Swine" data series for "Farrow to Finish" costs from the Iowa State University, available at <http://www2.econ.iastate.edu/estimated-returns/>. The data and methods used to construct the index are as described in Lee L. Schultz, *Procedure for Estimating Returns Farrow to Finish*, Iowa State University (2014), available at <http://www2.econ.iastate.edu/estimated-returns/Farrow%20to%20Finish%20Procedure.pdf>.

rise and fall together, regardless of geography, making this metric a reasonable proxy for all Defendants.³⁰⁹ To the extent that a given Defendant has a cost advantage relative to its peers, and to the extent this advantage is fixed over time, this difference would be accounted for in the Defendants' fixed effects described below. *Second*, I include costs of running the processing plant to produce a pound of finished pork, as measured by the average monthly "Total Plant Cost Cents Per Pound" as calculated by Agri Stats. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]³¹⁰ Because these Agri Stats data are only available between November 2007 and February 2019, I impute the values before and after those periods.³¹¹ *Third*, I control for the increased pig mortality caused by the Porcine Epidemic Diarrhea virus—which primarily kills piglets—by controlling for Piglet Loss Rate six months before the sale date, roughly

³⁰⁹ The USDA's "Daily Pork Reports" tracks national, Iowa/Minnesota, Western Cornbelt, and Eastern Cornbelt hog prices. The average daily difference in hog prices between the three regions is \$1.90, or 2.7% of an average \$70.51 priced hog. *See* my workpapers for details. *See also* USDA, *Daily Pork Reports*, available at <https://www.ams.usda.gov/market-news/daily-pork-reports>.

³¹⁰ AGSTAT-P-0002614731 at -734.

³¹¹ As labor is the primary cost driver in this calculation, I regress the observed plant cost on the observed average weekly wages of "Animal slaughtering and processing" employees as measured by the Bureau of Labor Statistics, including a control for seasonality. This regression explains 85% of the variation in plant expenses during the period of data overlap. I use that regression equation to predict the missing data values. In the alternative, I also test a linear time trend and seasonality, which explains 83% of the variation in plant expenses, and use that equation to predict the missing data values.

the time it takes for a pig to reach slaughter maturity.³¹² *Fourth*, for bacon sales only, I include a Bacon Ingredient Mix index to control for the additional costs of curing bacon.³¹³

154. I select three variables to model how demand for pork products may have changed over time. *First*, I include a “Swine Flu” dummy variable set to one if the sale occurred during the 2009 H1N1 swine flu pandemic.³¹⁴ This variable controls for the fact that domestic pork demand dropped sharply because of (misplaced) consumer fears that eating pork might result in infection.³¹⁵ *Second*, I include the indexed price of beef and chicken during the same period of the pork sale.³¹⁶ As noted in Part II.A.4, the USDA estimates that the cross-price elasticity of pork with respect to the price of beef is 0.48, while

³¹² This data comes from a Seaboard internal analysis “SeaboardSD0009(Hog Production Report).” 2014 values were unavailable. I use the piglet loss rate from January 2015 for the 2014 observations. I exclude this variable as a robustness check in the Appendix in the event this data is not representative of national pig litter mortality.

³¹³ I used data from BLS, *Processed Foods and Feeds: Table Salt (Evaporated), Pepper (White and Black), and Other Spices*, Producer Price Index, available at <https://fred.stlouisfed.org/series/WPU02890156>.

³¹⁴ I code the variable as one starting in June 2009, when the World Health Organization raised worldwide pandemic alert level to phase 6 and all 50 states reported cases, ending in August 2010, when the World Health Organization declared the pandemic over. *See 2009 H1N1 Pandemic Timeline*, CENTERS FOR DISEASE CONTROL AND PREVENTION, accessed April 2022, available at <https://www.cdc.gov/flu/pandemic-resources/2009-pandemic-timeline.html>.

³¹⁵ *See, e.g., Potential Farm Sector Effects of 2009 H1N1 “Swine Flu”: Questions and Answers*, CONGRESSIONAL RESEARCH SERVICE, (updated Jan. 12, 2010), available at <https://crsreports.congress.gov/product/pdf/R/R40575/11>. *See also* Andrew Martin and Clifford Krauss, *Pork Industry Fights Concerns Over Swine Flu*, THE NEW YORK TIMES, (Apr. 28, 2009), available at <https://www.nytimes.com/2009/04/29/business/economy/29trade.html>.

³¹⁶ I use the U.S. Bureau of Labor Statistics’ consumer price data for the U.S. city average, all urban consumers, seasonally adjusted. BLS, *Poultry index “CUSR0000SEFF”*, accessed Apr. 2022, available at <https://beta.bls.gov/dataViewer/view/timeseries/CUSR0000SEFF>. BLS, *Beef and Veal index “CUSR0000SEFC”*, accessed Apr. 2022, available at <https://beta.bls.gov/dataViewer/view/timeseries/CUSR0000SEFC>. I weight beef and poultry based in the composite index based on their relative weighting in the BLS’s CPI calculations. *See* BLS, *Relative importance of components in the Consumer Price Indexes: U.S. city average in December 2021*, (modified Feb. 2022), available at <https://www.bls.gov/cpi/tables/relative-importance/2021.htm>.

the cross-price elasticity of pork with respect to the price of poultry is 0.28, indicating that these products are weak substitutes for pork. As the prices of these substitute meats rise, we would expect to see some consumers substitute into pork products.³¹⁷ *Third*, I include an index of the number of pork product recalls active in a three-month period prior to the sale, under the assumption that a high number of pork recalls may depress pork demand.³¹⁸

155. I add three additional variables to help control for seasonal and long-term trends. To account for seasonal variation in the demand for certain types of pork, I add cut-by-month dummy variables for each of the main category cuts of pork.³¹⁹ I also include a control for the real U.S. Gross Domestic Product Per Capita, which is a widely-used economic barometer of both labor productivity and standard of living, that also helps control for national economic shocks such as recessions or the COVID-19 Pandemic.³²⁰ I also add a

³¹⁷ Abigail Okrent and Julian Alston, *The Demand for Disaggregated Food Away-From-Home and Food-at-Home: Products in the United States*, UNITED STATES DEPARTMENT OF AGRICULTURE, (Aug. 2012), Table A. 10, available at https://www.ers.usda.gov/webdocs/publications/45003/30438_err139.pdf?v=3773.8.

³¹⁸ I use data from U.S. Department of Agriculture's Food Safety Inspection Service, and counted the number of recalls publicly reported, available at <https://pregunteleakaren.gov/wps/portal/fsis/topics/recalls-and-public-health-alerts/recall-case-archive>. I use the method developed in Thomas L. Marsh, Ted C. Schroeder, and James Mintert, *Impacts of Meat Product Recalls on Consumer Demand in the USA*, 36 APPLIED ECONOMICS 897-909 (2004). Later papers implemented the same safety measure as well, see e.g., Glynn T. Tonsor, James R. Mintert, and Ted C. Schroeder, *US Meat Demand: Household Dynamics and Media Information Impacts*, 35(1) JOURNAL OF AGRICULTURAL AND RESOURCE ECONOMICS 1-17 (2010).

³¹⁹ I use the same broad categories of Pork used elsewhere in this report, Bacon, Belly, Loin, Rib, and Shoulder.

³²⁰ *Real gross domestic product per capita*, U.S. BUREAU OF ECONOMIC ANALYSIS, (accessed Apr. 2022), available at <https://fred.stlouisfed.org/series/A939RX0Q048SBEA>. *Per Capita GDP*, Investopedia, (updated Jan. 30, 2022), available at <https://www.investopedia.com/terms/p/per-capita-gdp.asp>. *How Should Labor Productivity Be Measured?*, ST. LOUIS FEDERAL RESERVE BLOG, (Mar. 3, 2015), available at <https://www.stlouisfed.org/on-the-economy/2015/march/how-should-labor-productivity-be-measured>.

linear time trend to control for any general changes that occur over time (such as technological or efficiency increases), which also may have an effect on pork prices.³²¹

156. Defendants produced data for the “After Period”, defined as July 2018 through December 2020). This time period may still be contaminated by the effects of the Challenged Conduct, or it may be that the conspiracy was still in effect during this period. I account for this “After Period” in two ways. In my primary model, I add a dummy variable to control for the “Post Class Period” defined as July 2018 through the end of the data in December 2020, which ensures that data from this period does not serve as a benchmark. For this period, I additionally include a dummy variable to account for the COVID-19 induced spike in pork prices in 2020.³²² As a robustness check, in the Appendix I simply exclude any data post July 2018.

157. Summary statistics for these regression inputs are reported in Table 11 below.³²³ All dollar values have been converted to 2021 dollars to account for inflation.

³²¹ WOOLDRIDGE at 360 (“Many economic time series have a common tendency of growing over time. We must recognize that some series contain a time trend in order to draw causal inference using time series data.”). *See also* Hahn (2004) at 10 (“The prices that consumers pay for beef and pork have increased less rapidly than inflation. In other words, the real cost of beef and pork is declining. Economists assume that this downward trend in real prices over the long run shows that the beef and pork production/marketing systems are becoming more efficient.”).

³²² The COVID-19 variable is set to 1 in April, May, and June 2020.

³²³ Outliers have been removed from the regression data set, defined as any transaction with (1) a price-per-pound under \$0.01 and over \$20, (2) unit quantities purchased less than 1. My conclusions are robust to the inclusion or exclusion of these outliers. Robustness regressions of with the inclusion of outlier observations are shown in the Appendix.

158. In the regression model, I also test two different combinations of product and customer fixed effects for three “Models” in total. A fixed effect is a variable that holds constant all unobserved individual-specific characteristics that are unchanging over time. A product fixed effect accounts for the fact that a particular pork product sells at a different price point than others in its category, while a processor fixed effect accounts for the fact that a particular processor may charge a premium relative to others. In Model 1 (the first column of regression results in Table 12) I omit the use of product and customer fixed effects as a base case. In Model 2 (Table 12 column two), I use processor-product fixed effects to hold constant individual product from each Defendant. In Model 3 (Table 12 column three), I use processor-product-customer type fixed effects, which additionally holds constant the “type” of Direct Purchaser (i.e., distributors versus retailers) to which the sale is made. Finally in Model 4, I use processor-product-customer ID fixed effects, which controls for the individual customer the specific product is sold to.

159. The results of the four econometric Models appear in Table 12 below. The dependent variable (Defendants' Wholesale Price Per Pound) and the continuous variables are reported in natural logs, which allows the coefficients of the independent variables to be interpreted as a percentage change in the dependent variable, given a one-percent change in the independent variable.³²⁴ [REDACTED]


[REDACTED]

[REDACTED]

For a binary variable, the coefficient (times 100) can be approximately interpreted as the percentage increase in Defendants' wholesale prices per pound when the variable is "on".³²⁵ For example, the coefficient on Swine Flu equals approximately -0.10, meaning that, other things in the model held equal, prices were 1 percent lower during the Swine Flu period than in the rest of the data.

³²⁴ WOOLDRIDGE at 232 ("[W]hen $\log(y)$ is the dependent variable in a model, the co-efficient on a dummy variable, when multiplied by 100, is interpreted as the percentage difference in y , holding all other factors fixed.").

³²⁵ WOOLDRIDGE at 190-191. ("In other words, simply using the coefficient (multiplied by 100) gives us an estimate that is always between the absolute value of the estimates for an increase and a decrease. If we are specifically interested in an increase or a decrease, we can use the calculation based on equation (6.8). $[\% \Delta \hat{y} = 100 * [\exp(\beta_2 \Delta x_2) - 1]]$ ").



160. The four regression Models in Table 12 reveal the expected economic relationships between the independent variables and wholesale pork prices. Wholesale pork prices rise as live hog, plant costs, and the piglet loss rate rise. Similarly, the Swine Flu period saw generally depressed wholesale prices. Consistent with expectations, wholesale pork prices rise when Chicken and Beef prices rise, and fall slightly when the number of active pork recalls is high. Finally, the price of pork rises as GDP per capita rises, while the linear trend indicates that pork prices are falling over time, all-else-equal, due to long-term

trends.³²⁶ The individual regression coefficients are all statistically significant at the 1 percent level.³²⁷

161. More importantly, the Conduct variable is both economically and statistically significant. All three Models reveal higher Defendants' wholesale pork prices during the Conduct Period, after accounting for other relevant supply and demand-side factors. Model 1 reveals that the Conduct Period is associated with 15.3 percent higher prices, with Models 2 and 3 and showing 14.2, and Model 4 showing 12.8 percent inflated prices, respectively. The results of my econometric analysis, along with economic logic and the contents of the documents I have reviewed support the inference of a causal nexus between Defendants' Conduct and injury to competition. I therefore conclude that Defendants overcharged Direct Purchasers by approximately 12.8 to 15.3 percent due to the Challenged Conduct.³²⁸ Conservatively using the lowest Conduct coefficient estimate (12.8 percent) from Model 4,

³²⁶ See Hahn (2004) at 10, ("The prices that consumers pay for beef and pork have increased less rapidly than inflation. In other words, the real cost of beef and pork is declining. Economists assume that this downward trend in real prices over the long run shows that the beef and pork production/marketing systems are becoming more efficient.").

³²⁷ A standard F-test confirms that the independent variables in every regression model are collectively highly statistically significant ($p < 0.001$). The constant term is the intercept parameter of the model and does not have a direct interpretation. See WOOLDRIDGE at 23.

³²⁸ WOOLDRIDGE at 13 ("[T]he problem of inferring causality disappears if an appropriate experiment can be carried out.").

I calculate that the *percentage reduction* in price in the absence of the Challenged Conduct is -12 percent.³²⁹

162. All four Models tested above show the same general economic and statistical relationships between the independent variables and pork prices. The main difference between the models is the amount of variation in wholesale pork prices that the model explains, as measured by the R-Squared. Without product or customer fixed effects, the Model 1 explains approximately 41 percent of the variation in price. When controlling for the processor, the product, and the customer type, Model 3 explains 87 percent of the variation in price. When controlling for the specific customer, Model 4 explains 93 percent of the variation in price. However, a higher R-Squared does not necessarily imply a better or more robust estimate of any of the independent variables such as the Conduct; a high R-Squared model simply means that the model explains more variation in the price than a low R-Squared model.³³⁰

³²⁹ While the Conduct coefficient is approximately the same as overcharge/price reduction amount, I specifically use an equation to derive a percentage change associated with one-unit decrease in the Conduct, moving from “1” to “0” [*Price Reduction* % = $(\exp(-\text{coeff_prod_ctype}) - 1)$]. See WOOLDRIDGE at 190-191. (“In other words, simply using the coefficient (multiplied by 100) gives us an estimate that is always between the absolute value of the estimates for an increase and a decrease. If we are specifically interested in an increase or a decrease, we can use the calculation based on equation (6.8). [$\% \Delta \hat{y} = 100 * [\exp(\beta_2 \Delta x_2) - 1]$ ”).

³³⁰ Wooldridge at 200-201. (“Until now, we have not focused much on the size of R^2 in evaluating our regression models, because beginning students tend to put too much weight on R-squared. As we will see shortly, choosing a set of explanatory variables based on the size of the R-squared can lead to nonsensical models... Nothing about the classical linear model assumptions requires that R^2 be above any particular value; R^2 is simply an estimate of how much variation in y is explained by x_1, x_2, \dots, x_k in the population... Although this means that we have not accounted for several factors that affect y , this does not mean that the factors in u are correlated with the independent variables.”).

2. Regression Using USDA Wholesale Pork Price Data

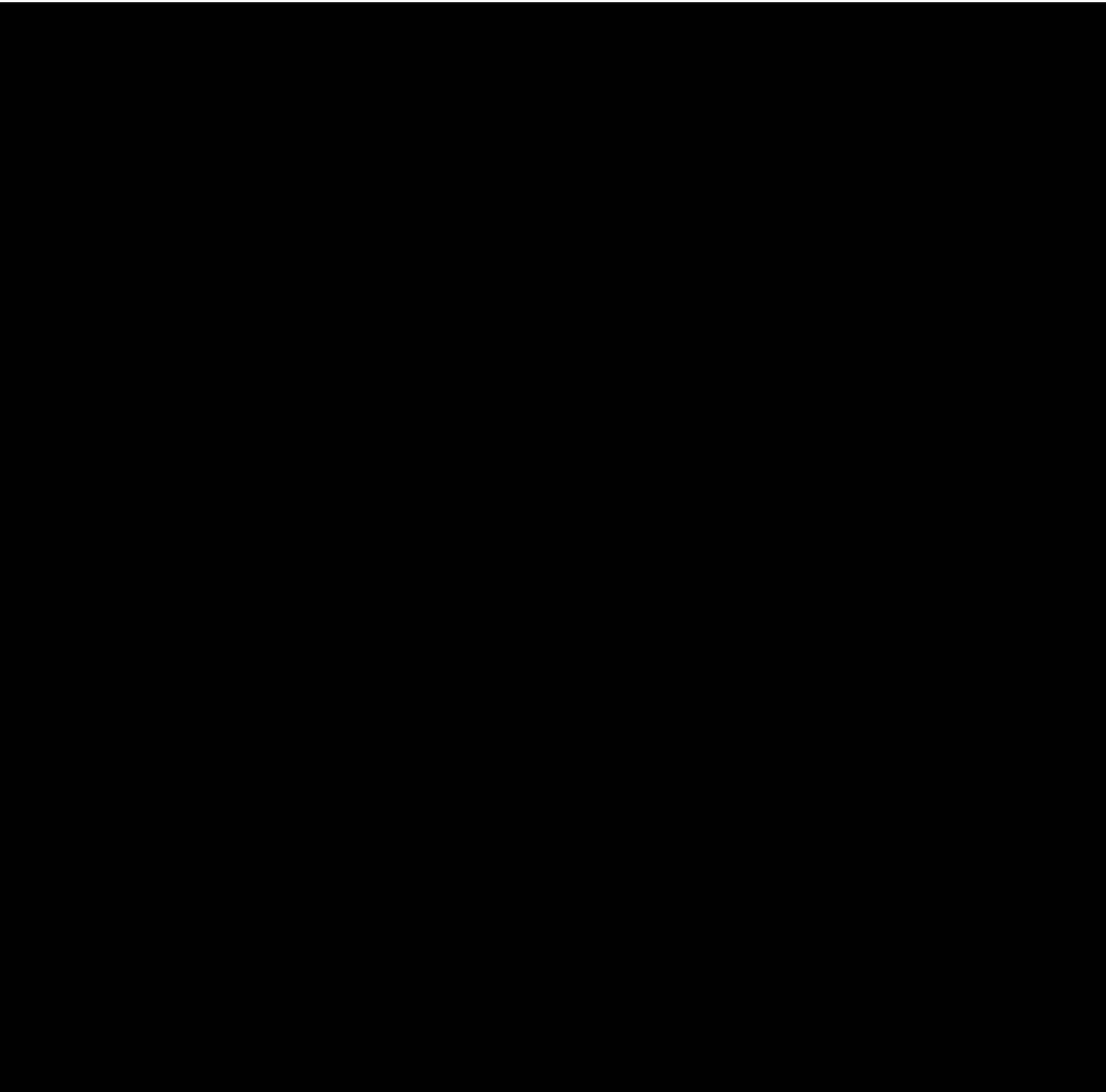
163. As a robustness check to the regression model above, and to check that the regression results revealed above are not due to the particularities of Defendant's data, I tested the same regression model variables on national pork wholesale prices as measured by the United States Department of Agriculture.³³¹ Given that Defendants' control account for approximately 80 percent of national hog slaughter capacity, I expect that any generalized overcharge found in Defendants' sales data would similarly be reflected in national wholesale pork price averages.³³²

164. I test the same hypothesis that, holding other factors constant, Defendants' actions resulted in increased national pork wholesale prices during the Conduct Period, defined as January 2009 through December 31, 2020. To compare with Defendants' sales data, I limit the USDA data series to the same timeframe as produced by Defendants, April 2004 through December 2020, which yields 201 monthly wholesale price data points. I use the same set of control variables described in part IV.A.1 above for the Defendants' sales data.³³³ Table 13 shows the summary statistics for the control variables, and the results of these regressions shown in Table 14. Model 1 includes the post Class Period data, while Model 2 excludes it.

³³¹ I used wholesaler (processor) pork prices from *Meat Price Spreads data series*, UNITED STATES DEPARTMENT OF AGRICULTURE, available at <https://www.ers.usda.gov/data-products/meat-price-spreads/>. See also Hahn (2004).

³³² The USDA reports a single average wholesale pork price per pound in each month. Because the data do not contain individual products, it is not possible to separate out Class Pork Products versus pork products generally.

³³³ I make two necessary modifications. First, I omit the Bacon Ingredient Index as it is not possible to identify Bacon sales specifically. Second, lacking individual product classifications, I employ monthly fixed effects rather than product and month fixed effects.



165. The regression results are remarkably similar to those from the Defendants' sales data. Each of the independent variables show the same direction and similar economic significance as they did when applied to the Defendants' data. As before, the regression model reveals higher wholesale pork prices during the Conduct Period after accounting for

other relevant supply and demand-side factors. The models imply that Defendants overcharged Direct Purchasers by approximately 12.9 to 16.5 percent due to the Challenged Conduct, which is consistent with the previous results from Defendants' sales data which imply an overcharge of 12.8 to 15.3 percent. Thus, the validity of the regression model is evidenced by the fact that it yields consistent results when employed on two entirely different datasets.

B. The Challenged Conduct Reduced the Domestic Quantity of Pork

166. In Part II.A.3 I demonstrated that higher retail pork prices imply lower quantities of pork sold. Using Defendants' sales data and estimates from the literature, I showed that the own-price elasticity of demand for Pork is between -1.26 and -1.65, meaning that a one percent increase in pork prices leads to a reduction in pork demanded of 1.26 to 1.65 percent at the consumer level. Using the overcharge percentage from the regression model in Part IV.A, I can estimate the quantity of pork that would have been demanded (and in a competitive market, sold) in the absence of the Challenged Conduct.³³⁴

167. Table 15 below summarizes the five own-price elasticity estimates from Part II.A.3, ranked from low to high, and uses the but-for price reduction percentage derived from the Conduct coefficient in Model 4 of Table 12. Recalling that $E_{own} = \frac{\% \Delta q}{\% \Delta p}$, I rearrange to isolate the change in quantity ($E_{own} * \% \Delta p = \% \Delta q$) and use the estimates of E_{own} and the but-for reduction in price of 12 percent. I estimate that in the but-for world absent the Challenged Conduct, Defendants (who collectively comprise 80 percent of U.S. slaughter

³³⁴ This exercise assumes a constant elasticity demand curve for pork.

capacity)³³⁵ would have sold [REDACTED], or between [REDACTED] additional pounds over the Class Period.

V. COMMON IMPACT

168. Using a standard two-part method, I demonstrate that the Challenged Conduct can be shown to have impacted all or nearly all indirect pork purchasers during the Class Period. *First*, I demonstrate using two independent and mutually reinforcing methods that all or nearly all Direct Purchasers paid inflated pork prices due to the Challenged Conduct. *Second*, I show using quantitative and qualitative evidence that the Direct Purchases passed these inflated pork prices paid on to Class Members through the supply chain. While *any* evidence of pass-through implies that Class Members were harmed by the Challenged Conduct, the evidence below demonstrates that the weighted average pass-through rate from a Direct Purchaser to a Class member is [REDACTED]. This implies that Class Members bore [REDACTED] percent of the [REDACTED] to Direct Purchasers.

³³⁵ See Table 3.

A. In-Sample Prediction Of Common Impact Shows Nearly All Direct Purchasers Paid Inflated Pork Prices

169. The first standard method of demonstrating Common Impact is to use an in-sample prediction that compares the price that each Direct Purchaser actually paid to the price they would have paid in the absence of the Challenged Conduct, as determined by the regression model. Under this method, a Direct Purchaser suffers antitrust injury whenever the price it pays on at least one transaction during the Class Period is above the price it would have paid in the absence of the Conduct. This standard form of in-sample prediction allows me to compute the proportion of Direct Purchasers that sustained antitrust injury on one or more occasions. Courts have certified several antitrust class action cases where Plaintiff's economists' have used this method to demonstrate Common Impact.³³⁶

170. The logic of this method is spelled out in the introductory chapter of the Federal Judicial Center's *Reference Manual on Multiple Regression*, which illustrates how multiple regression analysis can be used to determine whether individual plaintiffs suffered injury from employment discrimination.³³⁷ Here, I apply the same framework to determine

³³⁶ See, e.g., *In re Air Cargo Shipping Servs. Antitrust Litig.*, No. 06-MD-1775 JG VVP, 2014 WL 7882100 (E.D.N.Y. Oct. 15, 2014). See also *In re Capacitors Antitrust Litigation* (No. III), case No. 17-md-02801-JD, 2018 WL 5980139 (N.D. Cal. Nov. 14, 2018); *In re Packaged Seafood Prods. Antitrust Litig.* 332 F.R.D. 308 (S.D. Cal. 2019).

³³⁷ REFERENCE MANUAL at n.4 ("The first step in such a regression analysis is to specify all of the possible 'legitimate' (i.e., nondiscriminatory) factors that are likely to significantly affect the dependent variable and which could account for disparities in the treatment of male and female employees. By identifying those legitimate criteria that affect the decision-making process, *individual plaintiffs* can make predictions about what job or job benefits similarly situated employees should ideally receive, and then can measure the difference between the predicted treatment and the actual treatment of those employees. If there is a disparity between the predicted and actual outcomes for female employees, plaintiffs in a disparate treatment case can argue that the net 'residual' difference represents the unlawful effect of discriminatory animus on the allocation of jobs or job benefits.") (emphasis added).

whether individual Direct Purchasers suffered injury from the Challenged Conduct: The method begins with my econometric model from Part IV.A above, which controls for factors (other than the Challenged Conduct) that may affect pork prices.³³⁸ Next, my econometric model is used to predict the price that individual Direct Purchasers would have been paid under competitive conditions, and this prediction is compared to the compensation that Direct Purchasers actually paid.³³⁹ If the predicted competitive price for an individual Direct Purchaser on a given payment is less than the price the Direct Purchaser actually paid, this overpayment or “residual” represents antitrust injury to said Direct Purchaser attributable to the Challenged Conduct for that payment.³⁴⁰ In addition to a raw count of Direct Purchasers, I also weight each Direct Purchaser by the total amount of pork products purchased in dollars, as the Defendants’ sales data contain a long tail of Direct Purchasers with only a handful of purchase. Using the regression models developed in Part IV.A above, I estimate that over 99.99 percent of all Direct Purchasers (weighted by the volume of commerce) paid inflated prices, or 99.79 percent of All Direct Purchasers when unweighted. Table 16 summarizes these findings for each type of Direct Purchaser.³⁴¹

338 *Id.* (“The first step in such a regression analysis is to specify all of the possible ‘legitimate’ (i.e., nondiscriminatory) factors that are likely to significantly affect the dependent variable and which could account for disparities in the treatment of male and female employees.”).

339 *Id.* (“By identifying those legitimate criteria that affect the decision-making process, *individual plaintiffs* can make predictions about what job or job benefits similarly situated employees should ideally receive, and then can measure the difference between the predicted treatment and the actual treatment of those employees.”) (emphasis added).

340 *Id.* (“If there is a disparity between the predicted and actual outcomes for female employees, plaintiffs in a disparate treatment case can argue that the net ‘residual’ difference represents the unlawful effect of discriminatory animus on the allocation of jobs or job benefits.”).

341 The customer types I retain in the Defendants’ sales data are “Retail/Supermarket”, “Distributor”, “Traders,” “Brokers,” and “Further Processing”.

B. Common Price Structure of Pork Products

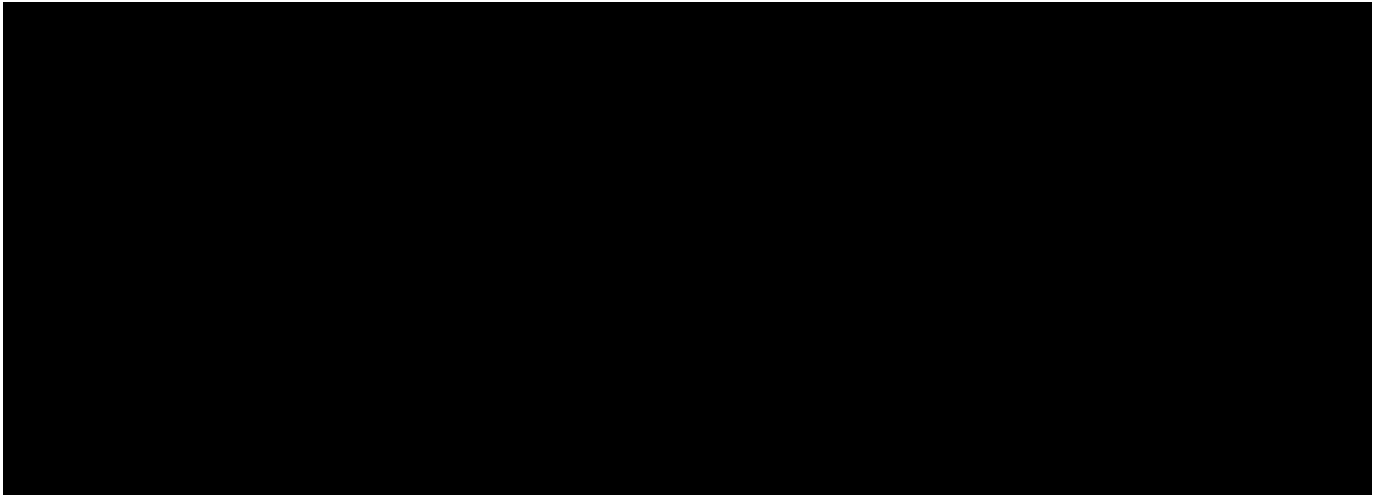
171. Another standard method of proving Common Impact is a two-pronged, class-wide approach that has been accepted in prior antitrust litigation, including in *High-Tech Employee Antitrust* and in *Arizona Travel Nurses*.³⁴² Although those cases are both compensation cases, the same principles apply in the evaluation of common movements within any pricing variable. The first prong requires class-wide evidence demonstrating that the Challenged Conduct had a generally inflationary effect on prices paid by Class Members; this has already been shown using my pricing regression model in part IV.A.1 above. The second prong involves determining whether there is class-wide evidence of a common pricing structure that would transmit the artificially inflated prices (found by the first prong) broadly across the Class. The second prong is demonstrated below.

³⁴² I was the plaintiffs' economic expert in *Arizona Travel Nurses*. The district court accepted my methodology for proving antitrust impact in *Johnson v. Arizona Hospital & Healthcare Ass'n*, No. CV 07-1292-PHX-SRB, 2009 WL 5031334 (D. Ariz. 2009) [hereafter *Johnson v. Arizona*]. The same "two-step" methodology utilized in *Johnson* was accepted by the court in *In re High-Tech Employees Antitrust Litigation*, 985 F.Supp.2d 1167, at 1206 (N.D. Cal. 2013), *Order Granting Plaintiffs' Supplemental Motion For Class Certification* ("Plaintiffs noted that Dr. Leamer's approach followed a roadmap widely accepted in antitrust class actions that uses evidence of general price effects plus evidence of a price structure to conclude that common evidence is capable of showing widespread harm to the class."). *See also, e.g.*, *Johnson v. Arizona* (finding predominance where conduct was alleged to suppress bill rates for nurses generally and evidence was presented that bill rates were correlated with nurse pay rates).

172. Using standard econometric methods, I performed regressions to test whether changes in prices are broadly shared across Direct Purchasers in Defendants' Sales Data. Similar to analyses performed by Plaintiffs' expert economist, Professor Edward Leamer, in *High-Tech Employee*, these regressions measure the extent to which an increase in average pork prices generally is statistically associated with an increase in pork prices paid by the individual. I test this in two ways. *First*, I test "Other Defendant's Average Same-Category Prices", or whether the average prices of other pork product categories charged by other Defendants are associated with the individual prices paid by a Direct Purchaser to their particular Defendant. (*E.g.*, is the price paid by Direct Purchaser A for a Belly product from Defendant 1 correlated with the average price of Bellies charged by Defendants 2-7.) *Second*, I test "Other Customers' Average Same-Product Prices", or whether the average prices of specific products purchased by other Direct Purchasers from the same Defendant are associated with the price paid by an individual Direct Purchaser. (*E.g.*, is the price paid by Direct Purchaser A for "product ID 123" from Defendant 1 correlated with the average price of "product ID 123" charged by Defendant 1 to other Direct Purchasers.) In each regression, I include cut-but-month fixed effects to control for the seasonality of prices.

173. The results of these regressions are shown in Table 17. As seen below in both regressions, an increase in the average other pork price is positively and highly statistically significantly related to the pork price paid by an individual. Specifically, increases in the average category price among other Defendants is associated with a 81 percent increase in price paid by a Direct Purchaser to the particular Defendants. Similarly, within a Defendants' data, increases to specific product prices paid by other Direct Purchases are associated with

a 77 percent increase in the price paid by a particular Direct purchaser. These results are consistent with the existence of a pricing structure and demonstrates that pork prices show a strong tendency to move together. This implies that any overcharge to a product or product category would have been broadly felt by Direct Purchasers across Defendants.



174. In summary, my regression analysis in Section IV demonstrates evidence of a general price overcharge to Direct Purchasers. The evidence above reveals that prices of pork products (1) move together across Defendants, and (2) move together between customers. This evidence shows that the price overcharge due to the Challenged Conduct was not confined to a subset of products or a subset of Direct Purchasers, but instead would have been broadly shared across all products and all Direct Purchasers—and therefore all Class Members.

C. Price Increases to the Direct Purchasers Were Passed on to the Indirect Customers Through the Supply Chain

175. Economic theory and empirical evidence demonstrate that any overcharge paid by Direct Purchasers due to the Challenged Conduct were passed on to the Class Members. Below, I demonstrate several methods to quantify the pass-through rate and show using

evidence common to the Class that the Overcharge impacted all Class Members. Importantly: Even a pass-through rate of one percent would transmit overcharges to Indirect Purchasers and commonly impact all Class Members. Below, I show that actual pass-through rates were approximately 100 percent, which is consistent with economic theory that predicts that 100 percent of marginal cost increases would be passed through to end users.

176. Class Members in this case are the “Indirect Purchasers” of Class Pork Products, meaning that they purchase pork products not directly from Defendants, but through a series of intermediary firms (“resellers”) that make up the pork supply chain. This chain begins with Defendants who sell to Direct Purchasers. The Direct Purchaser may then sell resell the product to the Class Member, or it may sell the product to other resellers before the product is finally purchased by the Class Member, as shown in the figure below.

Defendant Processor → Direct Purchaser → Reseller(s) → Class Member

For example, a typical supply chain through retail grocery store may look as follows:

Defendant Processor → Distributor → Grocer → Class Member

While large retail club stores may purchase directly from Defendants before selling to a Class Member:

Defendant Processor → Grocer → Class Member

At each stage along the chain, a reseller purchases the pork product from the firm up the supply chain and sells it to the entity down the chain.

177. Standard economic principles posit that prices depend on costs.³⁴³ Prices of retail goods like pork generally rise and fall with marginal costs.³⁴⁴ For resellers of pork, the marginal cost of a pork product is the previous firm's price, meaning that if the cost of pork increases to the Direct Purchaser, they will pass on that cost to their own customers.³⁴⁵ In perfectly competitive markets in the long run, firms pass through to buyers 100 percent of marginal cost increases or decreases in the form of correspondingly higher or lower prices.³⁴⁶ In the absence of perfect competition, or indeed any competition, economic principles of profit-maximization still dictate that prices will rise and fall with marginal costs, although this figure may be more or less than 100 percent.³⁴⁷ For a demand curve with a constant

³⁴³ See, e.g., MANKIW at Chapter 4; Chapter 13.

³⁴⁴ *Id.* at 256.

³⁴⁵ Assuming the firm does need to employ additional resources to handle one extra unit of Pork.

³⁴⁶ MANKIW at 272, Figure 1 (showing price = marginal revenue = marginal cost for a competitive firm).

³⁴⁷ See, e.g., Jerry Hausman & Greg Leonard, *Efficiencies from the Consumer Viewpoint* 17(3) GEORGE MASON LAW REVIEW 708 (1999) ("profit maximization by the firm causes it to pass through at least some of the cost savings in terms of a lower price, even if the firm is a monopolist."). In addition to imperfect competition, there may be delays before a price change is fully realized by consumers, which can temporarily grow or erode reseller margins. See, e.g., TF-P-001074604 (or HFC-PORKAT0000320282, SMITHFIELD01176261, JBS-PORK-00287921), a Weekly BMI Wire [REDACTED] Apr. 18, 2013 [REDACTED]

[REDACTED] SMITHFIELD01263429, a [REDACTED] news roundup email from June 2010, with a quote from Dr. Steve Meyer of Paragon Economics. [REDACTED]

elasticity where firms keep their price-cost markup fixed (a common reseller pricing strategy)³⁴⁸ pass-through exceeds 100 percent.³⁴⁹ Keeping the price-cost margin appears to be the standard in this industry. For example, Brian Taphorn of Seaboard explained that retailers buy pork from Seaboard at a certain price and then mark it up by a percent, with [REDACTED] being a [REDACTED] targeted gross margin.³⁵⁰ Similarly, Paul Peil of Hormel testified that [REDACTED]

[REDACTED] This suggests that resellers tend to hold their margins fixed as a percentage, which would result in pass-through rate over 100 percent.

[REDACTED] KERN00116912, a 2013 report by Procurement Strategies Inc. titled Meat Markets Under a Microscope, [REDACTED]

[REDACTED] TF-P-001752890, Informa Economics – Hogs and Pork Update, May 3, 2010 at 13 [REDACTED]

³⁴⁸ Utpal M. Dholakia, *When Cost-Price Pricing Is a Good Idea*, Harvard BUSINESS REVIEW, (July 12, 2018) (“Cost-plus pricing is a lot like the romance novel genre, in that it’s widely ridiculed yet tremendously popular. Almost every manager I know will claim they hate pricing based only on costs. Yet cost-plus pricing remains the most widespread pricing method, used to price everything from a bottle of beer in a bar to multibillion-dollar infrastructure projects. The idea behind cost-plus pricing is straightforward. The seller calculates all costs, fixed and variable, that have been or will be incurred in manufacturing the product, and then applies a markup percentage to these costs to estimate the asking price. The markup is stipulated by the buyer, as is often the case with government contracts, or it can be chosen by the manager. (I have seen companies use markups ranging from 5% to 800%.).”).

³⁴⁹ Dijk & Verboven (2008) at 2342 (“When the price elasticity of demand is constant, $\eta=0$, and firms find it optimal to keep their percentage price-cost markup constant regardless of the cost conditions. This implies that a cost increase would lead to a higher absolute price cost-margin, which promotes pass-on.”).

³⁵⁰ Taphorn Dep. at 125:9-15; 183:3-18.

³⁵¹ Deposition of Paul Peil (December 9, 2021) [hereafter Peil Dep.] at 162:16-25.

178. Economists can use two different definitions of “pass-through” which can engender confusion. The *dollar* increase in retail price arising from a *dollar* increase in cost is the “absolute pass-through.”³⁵² The *percentage* increase in retail price arising from a *percentage* increase in cost is the “pass-through elasticity.”³⁵³ For the remainder of this report, I will refer to absolute pass-through, as it quantifies the overcharge in dollars terms felt by Class Members given a dollar overcharge by Defendants. Consider Table 18 below, in which a retailer purchases pork at \$1, marks up the price by 50% (multiplies the cost by 1.5), and sells to consumers for \$1.5. If pork prices increase from \$1 to \$2 *and* the retailer maintains its standard 50% markup, it sells the pork at $\$2 * 1.5 = \3 . The absolute pass-through in this case would be 150%: Given a \$1 change in wholesale price, consumers paid \$1.5 more, and the retailer pocketed the difference of \$0.50. Expressed as a percentage, the pass-through elasticity is 100%: the wholesale cost increased by 100% (\$1 to \$2) and the retail price increased by 100% (\$1.5 to \$3).

TABLE 18: PASS-THROUGH EXAMPLE, CONSTANT MARKUP

	Wholesale Cost	Retailer Markup Ratio	Retail Price	Retailer's Margin
Before:	\$1.00	1.5	\$1.50	\$0.50
After:	\$2.00	1.5	\$3.00	\$1.00
Change:	\$1.00	0	\$1.50	\$0.50

Absolute Pass-Through ($\Delta P/\Delta C$):	150%
Pass-Through Elasticity ($\% \Delta P/\% \Delta C$):	100%

³⁵² RBB Economics, *Cost pass-through: theory, measurement, and potential policy implications*, Commissioned by the United Kingdom's Office of Fair Trading, February 2014, available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/320912/Cost_Pass-Through_Report.pdf, at 11, [hereafter RBB].

³⁵³ *Id.* To convert from the pass-through elasticity to the absolute pass-through, multiply by the price/cost ratio.

Alternatively, consider the same situation in Table 19, but now the retailer decreases its markup ratio from 50% to 25% (multiplies the cost 1.5 to 1.25) such that it does not earn additional marginal dollars given the price increase. The absolute pass-through in this case would be 100%: Given a \$1 change in wholesale price, consumers paid \$1 more. Expressed as a percentage, the pass-through elasticity is ~66.7%: the wholesale cost increased by 100% (\$1 to \$2) and the retail price increased by ~66.7% (\$1.5 to \$2.5).

TABLE 19: PASS-THROUGH EXAMPLE, DECREASING MARKUP

	Wholesale Cost	Retailer Markup Ratio	Retail Price	Retailer's Margin
Before:	\$1.00	1.5	\$1.50	\$0.50
After:	\$2.00	1.25	\$2.50	\$0.50
Change:	\$1.00	-0.25	\$1.00	\$0.00

Absolute Pass-Through ($\Delta P/\Delta C$):	100%
Pass-Through Elasticity ($\% \Delta P/\% \Delta C$):	66.7%

The first scenario is an example of “cost amplification” in pass through, and the second is an example of complete pass-through.³⁵⁴ In addition, the retailer could also drop its markup further in order to partially immunize customers from the price increase, eroding its own margins in the process – an example of “cost absorption”.³⁵⁵ Modeling and empirical studies of absolute pass-through show wide ranging variation across models and industries, but

³⁵⁴ RBB at 12.

³⁵⁵ *Id.* If the retailer dropped its margin to 1.1 in response to a dollar increase, the new price would be \$2.2 (70% pass-through), and the retailers margin will have shrunk from \$0.50 to \$0.20 per unit.

absolute pass-through rates between 70 and 110 percent are not uncommon in empirical studies of pass-through.³⁵⁶

179. Below, I show that the absolute pass-through rate for pork products is approximately 100 percent when looking at specific third-party firm data which tracks the purchase and sale prices of individual Class Pork Products. This comports with the record evidence that industry expects pass-through rates of 100 percent, and with economic theory.

1. Empirical Estimate of Pork Pass-Through

180. The degree of absolute pass-through can be empirically measured if structured data for a reseller's costs and prices over time are available.³⁵⁷ The standard reduced form model takes the following form:³⁵⁸

$$p_{it} = \alpha + \beta mc_{it} + z_{it}\theta + \varepsilon_{it},$$

where subscript *it* is firm *i* at time *t*, *p* is price, *mc* is marginal cost, and *z* are other explanatory variables. The parameter β , when prices and marginal costs are measured in levels, represents the absolute pass-through. When prices and marginal costs are log form, β represents the pass-through elasticity, and absolute pass-through is obtained by multiplying

³⁵⁶ RBB at 113, noting empirical pass-through rates of 70 percent to 110 percent. *Id.* at 124-131, which shows pass-through rates from a literature review, ranging between 0 percent and 558 percent. Many of the estimate tend to cluster between 50 percent and 100 percent, however. RBB notes that “Empirical work on cost pass-through issues in industrial organisation settings is relatively new, and analysis that attempts to quantify pass-through rates in this context is scarce... Nevertheless, there is a small body of empirical work that has considered pass-through at the firm level, both in response to industry-wide and firm-specific cost changes.” *Id.* at 6.

³⁵⁷ Dijk and Verboven (2008) at 2341, (“Assessing pass-on using historical data[:] This approach makes use of historical data on prices, input costs, and other supply and demand factors affecting price to estimate the degree of pass-on. From an econometric perspective, this is a reduced form approach. That is, the approach enables one to measure the extent of pass-on without specifying a precise economic model that describes how all the economic factors work together.”).

³⁵⁸ RBB at 173.

the pass-through elasticity by the resellers average price to cost ratio.³⁵⁹ On each data set available to me, I test both a linear and logarithmic functional form to determine the absolute pass-through rate.

181. As a part of this litigation, Plaintiffs subpoenaed third-party resellers of pork products for their procurement (cost) and sales (price) during the Class Period.³⁶⁰ These firms represent a mix of different types of resellers in different points in the pork supply chain. Of the 39 third-party resellers with usable data, 16 are retail stores (grocery, club, discount, and convenience stores) and 23 are distributors or wholesalers.³⁶¹ The sales and procurement data are either in annual or monthly format, range from 2003 to 2022, and contain 1,615,130 observations in total. After matching products in the procurement dataset to the same products in the sales dataset, I remove outliers and limit each third-party to Class Pork Product sales only. I perform a pass-through analysis on each of the third-party datasets, using that firm's sale prices as the price variable and their purchase cost as the cost variable, controlling for product category and by-month seasonality if applicable.³⁶² I report both the median as well as the weighted average pass-through rate. As nearly all entities produced

³⁵⁹ *Id.* at 11.

³⁶⁰ At time of submission, discovery of third-party data was ongoing. Further data productions may alter this analysis.

³⁶¹ Porky Products has sales as a trader/broker in addition to its wholesaling sales.

³⁶² See, e.g., Ronald Cotterill, Leonard Egan, and William Buckhold, *Beyond Illinois Brick: The Law and Economics of Cost Pass-Through in the ADM Price Fixing Case*, 18 REVIEW OF INDUSTRIAL ORGANIZATION 45-52 (February 2001). See also David Besanko, Jean-Pierre Dubé, and Sachin Gupta, *Own-Brand and Cross-Brand Retail Pass-Through*, 24(1) MARKETING SCIENCE 123-137, 2005.

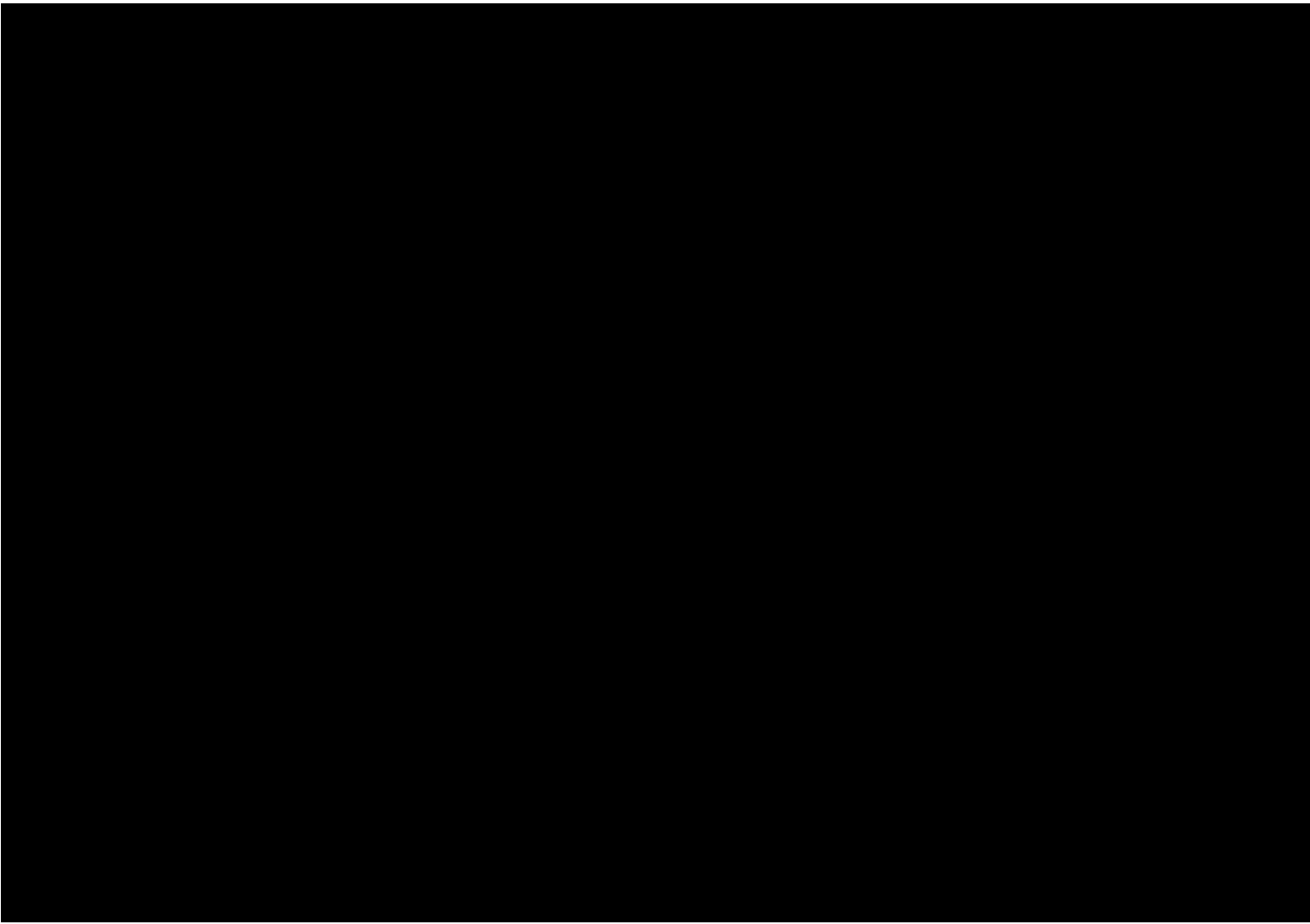
usable pass-through data for the year 2018, I use that year to weight the pass-through rates by net sales of Class Pork Products.

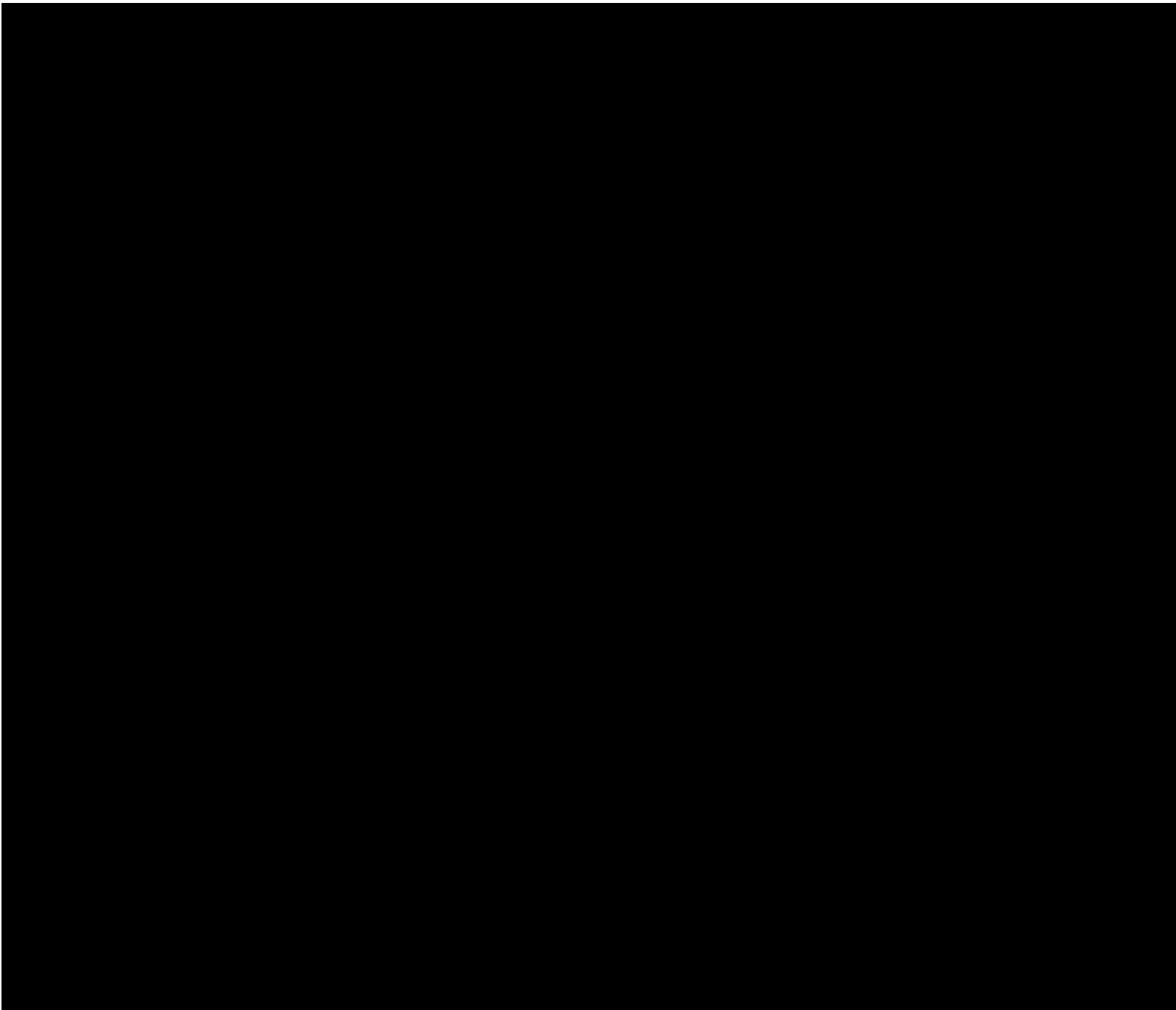
182. Table 20 shows that the absolute pass-through rate is [REDACTED]. This means that if Defendants overcharge Direct Purchasers [REDACTED]. The third-party firms that provided pass-through data collectively account for approximately 28 percent of Defendants' Direct Purchaser pork sales in 2018, the most common year of data obtained. These empirically determined pass through rates of approximately 100 percent are consistent with what economic theory predicts for a competitive market. That some pass-through rates exceed 100 percent may be evidence that the firm has some degree of market power.

183. Tables 21-23 show the pass-through rate by each of the main Direct Purchaser categories found in Defendants' sales data. [REDACTED]

[REDACTED].³⁶³

³⁶³ It is my understanding that discovery remains open. I reserve the right to amend my opinions should additional data be produced from other third-parties relevant to this pass-through analysis.





184. Summary statistics for each of third-party datasets are available in the Appendix. This empirical evidence of pass-through demonstrates that any artificially inflated pork prices paid by Direct Purchasers would have, in part or in full, be passed through to Class Members.

2. Documentary Estimate of Pork Pass-Through

185. Discovery from this case shows the Defendants were aware of and fully expected pass-through. In general, most evidence indicates that Defendants and industry analysts broadly expected price increases to be borne by consumers in full, (an absolute pass through rate of 100 percent), with some evidence that they expected retailers' margins to shrink (an absolute pass through rate of less than 100 percent).

186. For example, a draft 2008 annual report page for Smithfield noted that [REDACTED]

[REDACTED]³⁶⁴ In a 2011 Q2 earnings call, Tyson COO Jim Lochner stated that their direct purchasers [REDACTED]

[REDACTED]³⁶⁵ A 2013 Hormel report on inventory challenges noted, [REDACTED]

[REDACTED] Similarly, in an email exchange between Clemens executives on price increases, one notes that [REDACTED]

[REDACTED] Finally, the pricing analyses

³⁶⁴ SMITHFIELD01062391.

³⁶⁵ TF-P-001140324 at -339 [REDACTED]

conducted by Defendants tend to [REDACTED]

[REDACTED]³⁶⁶

187. The National Pork Producer Counsel predicted that [REDACTED]

[REDACTED]³⁶⁷ Dr. Steven Meyer, a regular consultant for the Counsel, agreed, testifying that prices would be passed on to [REDACTED]

[REDACTED] This implies a 100 percent pass through rate.

188. Industry analysts from the Conduct Period shared the same opinion. The Cleveland Research Company, whose agribusiness analyses were circulated among Defendants, wrote industry-wide pass-through statements like:

[REDACTED]³⁶⁹

Or:

³⁶⁶ See, e.g., TF-P-001418284, a 2014 Tyson Excel model showing retail prices charged by Walmart assuming a [REDACTED]. TF-P-001369602 shows Tyson modeling retail gross margins for pork loins and shoulders at [REDACTED]. SBF0147813 and SBF0147815, Grocers Supply pricing sheets showing gross margins from [REDACTED]. SMITHFIELD01213923 showing retail margins of [REDACTED].

³⁶⁷ SBF0149251 at -256

³⁶⁸ Deposition of Steven Meyer (April 26, 2022) at 105:16-25.

³⁶⁹ TF-P-000655793 at -797, a March 2013 report by the Cleveland Research Company sent to Tyson.

[REDACTED]
370

Or simply:

[REDACTED]
371

189. This evidence indicates that all industry participants expected cost increases to be ultimately born by the end customer. Further, it supports the empirical pass-through rates from the third-party data which show pass-through rates of approximately 100 percent.

VI. THE MUTUALLY REINFORCING QUALITATIVE AND QUANTITATIVE EVIDENCE IMPLICATE ALL DEFENDANTS AND PORK PRODUCTS

190. Economists recognize that qualitative and quantitative evidence can be mutually reinforcing in antitrust litigation.³⁷² In this section, I show that the mutually reinforcing qualitative and quantitative evidence analyzed above shows that the scope of the Challenged Conduct was pervasive across Product types and Defendants. As explained below, my econometric model, when altered to specifically show the effect of the Challenged Conduct on individual subgroups, shows that prices were artificially inflated for all five of the major pork product categories, for each of the seven Defendants, and for all types of Direct Purchasers. Similarly, my analysis of the documentary evidence reveals evidence of

³⁷⁰ SFD100308 at -309, a March 2010 report by the Cleveland Research Company.

³⁷¹ CLMNS-0000081356 and CLMNS-0000081357, Clemens' Josh Rennells forwards the Cleveland Research Company Food Inflation Report dated February 2011 noting "good information".

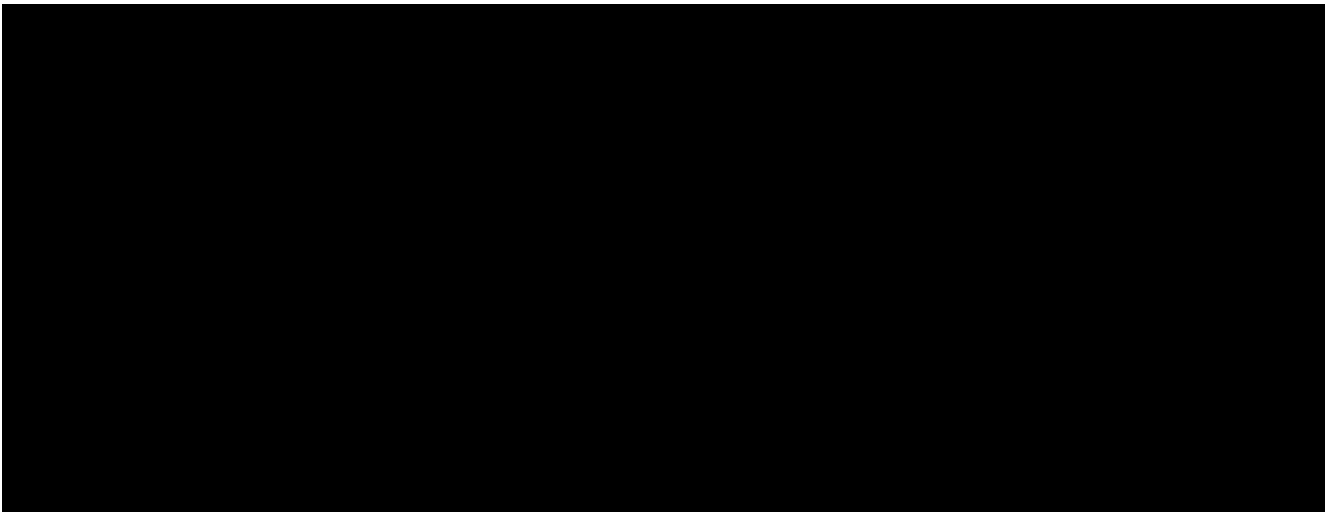
³⁷² Baker & Rubinfeld (1999) at 430-431.

anticompetitive information sharing for all pork product categories, all Defendants, and all Direct Purchaser Types.

A. Evidence for Product Subtypes

191. Tables 25 and 26 summarize the scope of the Challenged Conduct across product sub-types, with respect to (1) record (documentary) evidence and (2) econometric evidence. The first column in each table indicates whether there is record evidence of anticompetitive information sharing for a given pork product. The second column indicates whether there is econometric evidence of a statistically significant price increase during the Class Period for a given subgroup. This regression is the same as the one performed in Table 12 (Model 4) but limited only to those subgroup observations.

192. As shown in Table 23 below, every pork category was featured in the Agri Stats Sales reports, and every pork category (when estimated alone) yields a positive and significant conduct coefficient.



B. Evidence for Each Defendant

193. Table 24 below summarizes the scope of the Challenged Conduct across Defendants. As seen below, all Defendants used the Agri Stats reports, and standalone

regressions run on every Defendant that provided sales data before and during the conduct period yields a positive and significant conduct coefficient. I test Seaboard and Triumph both independently and collectively in light of their joint venture, in each case the conduct coefficient is positive. Only Clemens, who did not provide pre-conduct Sales data, does not have Defendant specific conduct coefficients. However, its Conduct Period data does contribute to the Conduct coefficient in Table 12, Model 1, which does not use any fixed effects and showed generalized price increases of about 15 percent.

C. Evidence for Direct Purchaser Type

194. Table 25 below summarizes the scope of the Challenged Conduct across the Direct Purchaser types present in Defendants' data. To my knowledge, no types of customer sales were specifically omitted from the Agri Stats reports, and standalone regressions run on every Direct Purchaser type yields a positive and significant conduct coefficient.



VII. AGGREGATE DAMAGES TO THE CLASS

195. In this section, I outline how a standard “but-for world” model can be used to estimate Aggregate Damages to class members using common evidence.³⁷³ A “but-for world” damages model assess what economic outcome would have occurred in a world absent the Challenged Conduct, and ascribes the difference between the actual and but-for world as the measurement of damages. In this case, Aggregate Damages to Class Members can be readily calculated using the evidence common to the Class as the product of (1) the generalized price overcharge estimated from the Defendants’ sales data regression model developed in Part IV.A above; (2) the aggregate dollar purchases made by Direct Purchasers during the Class Period; (3) the percentage of Direct Purchaser³⁷⁴ sales that are ultimately purchased by Class Members, and (4) the pass-through rate of the overcharges as determined

³⁷³ Dijk and Verboven (2008) at 2332, (“The concept underlying most economic damages assessments is that of the “but-for” world. In the case of a price-fixing agreement, the but-for world represents the economic outcome that would have occurred without the agreement. The difference between this counterfactual world and the actual world provides the measurement of damages.”).

³⁷⁴ I understand that some Direct Purchasers may, at various times during the Class Period, have been owned in full or in part by Defendants. I do not treat these Direct Purchasers any differently in my pass-through analysis or damages model. If it is determined that these subsidiary Direct Purchasers passed-through overcharges differently than independent Direct Purchasers, this can be modeled using evidence common to the class.

by the pass-through Analysis in Part V.B. I conservatively calculate Aggregate Damages using the coefficient on the Conduct variable of 12.8 percent from Model 4 of Table 12, which is associated with a competitive but-for world *price reduction* of 12 percent.³⁷⁵ Further, this calculation of damages keeps the quantity of sales that occurred constant. I do not model any lost welfare effects for sales that may have occurred in the but-for world under lower prices, as implied by economic theory and demonstrated in Part IV.B.³⁷⁶

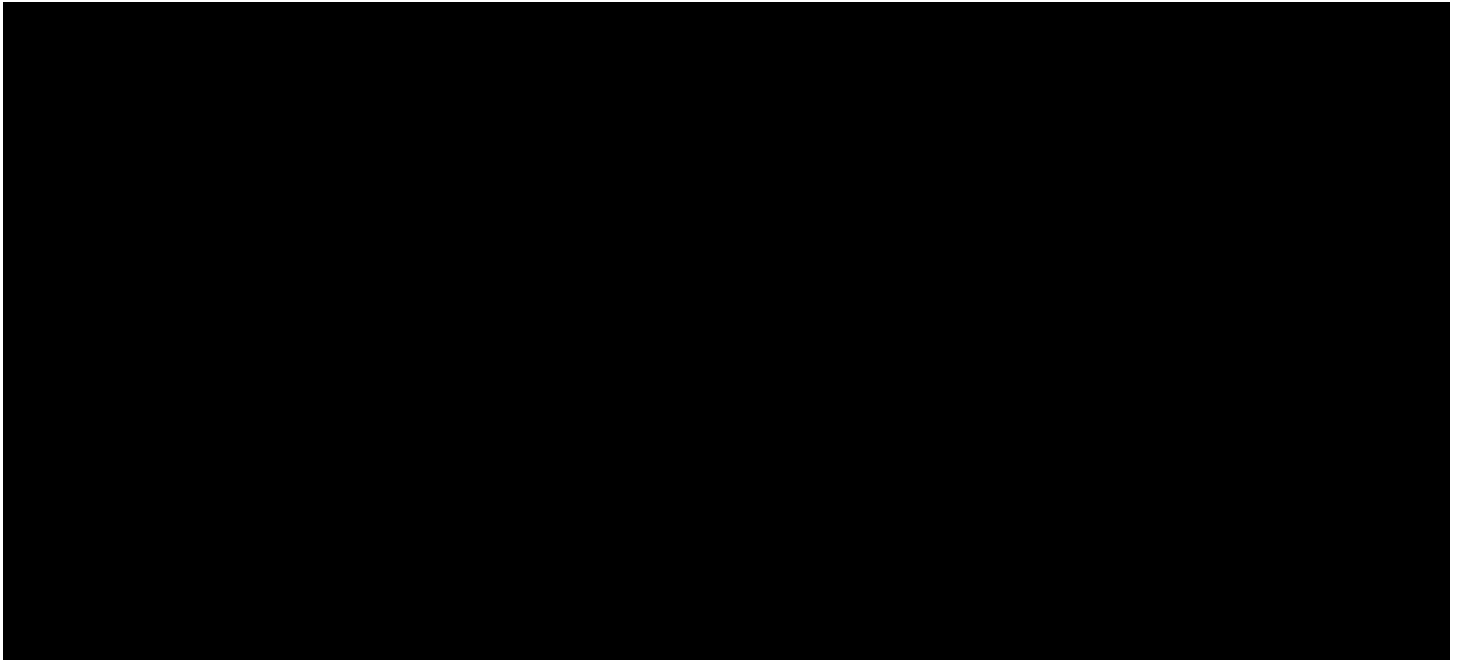
196. I model steps (1) and (2) in Tables 26 and 27 below, which summarize the total sales and overcharges by each of the Defendants and to each of the Direct Purchaser types respectively. Each table shows the But-For Price Reduction percentage as derived from the regression model and the total Nominal (not inflation adjusted) Dollar Sales of Pork Products from Defendants' sales data during the Class Period (July 2014 through June 2018) for Pork products. The Overcharge Amount is the absolute value of the Nominal Sales multiplied by the But-For Price Reduction.³⁷⁷ The Overcharge Amount attributable to Class Members (Class Overcharge) is the Overcharge Amount multiplied by the share of the U.S. population residing in the states which have repealed the Supreme Court's holding in *Illinois Brick Co. v. Illinois*, 431 U.S. 720, approximately 166.8 million U.S. consumers or 51.7 percent of the

³⁷⁵ See Part IV.A.1.

³⁷⁶ Dijk and Verboven (2008) at 2344, ("The fourth group [harmed by collusion] consists of the purchasers who would have purchased the product had the cartel members priced competitively but who did not purchase at all or who purchased a less preferred alternative. These purchasers make up part of the deadweight loss associated with the cartel price.").

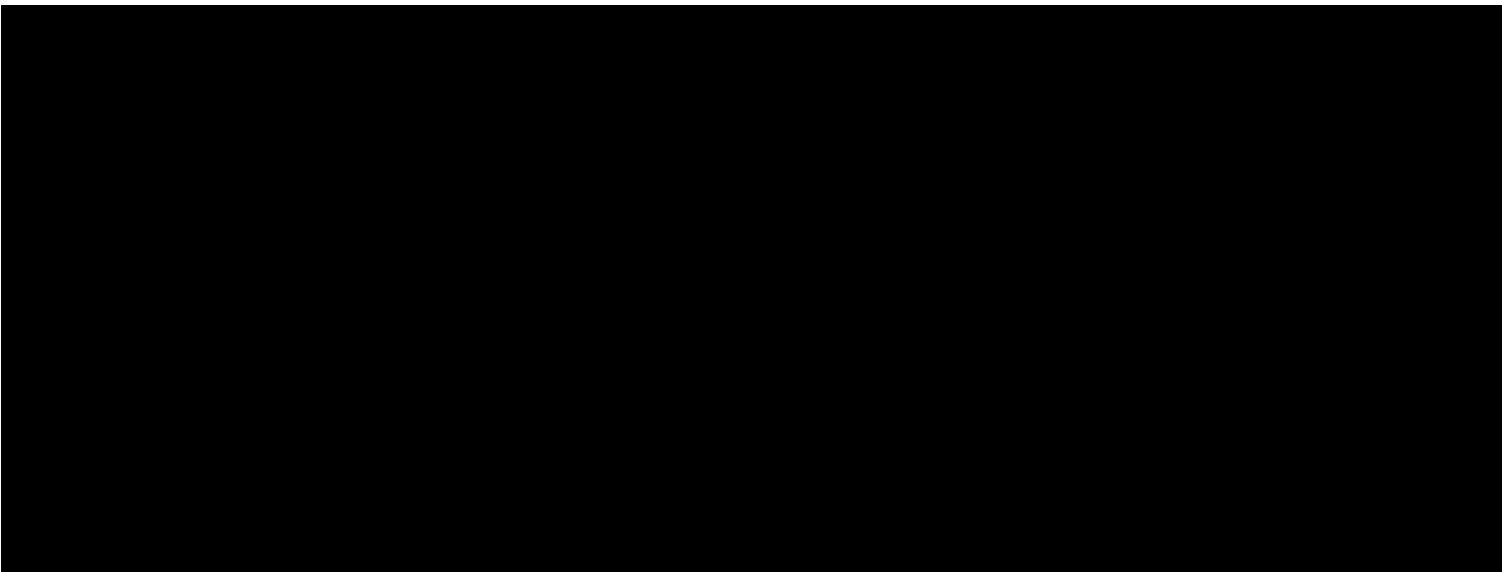
³⁷⁷ Alternatively, the But-For Dollar Sales can be calculated as *Actual Sales* * (1 + *ButFor Price Reduction*). The Overcharge Amount is therefore the difference between Actual Dollars sales and the But-For Dollar Sales.

population.³⁷⁸ As approximately 77 percent of American households purchase “fresh pork,” I estimate that there are approximately 128.4 million (166.8 million * 77%) Class Members.³⁷⁹ As shown below, the Class Overcharge Amount is \$2.818 billion over the four year class period.



³⁷⁸ Using the Census Bureau’s annual population estimates for 2014 through 2018, I summed the population in class states and divided by the U.S. total for each year and took the average. The Census population estimates are for July 1st of each year. *See Table 1. Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2019 (NST-EST2019-01)*, U.S. Census Bureau, Population Division, available at <https://www2.census.gov/programs-surveys/popest/tables/2010-2019/state/totals/nst-est2019-01.xlsx>.

³⁷⁹ *Share of households purchasing pork in the United States as of 2019, by type*, STATISTA, (Sep. 2019), available at <https://www.statista.com/statistics/1051294/american-consumers-buying-pork-by-type/>. Similarly, the National Pork Board reported that “86% of Americans eat pork in a two-week period” in 2001. *Consumer Attitudes: What They Say and What They Do*, PORK GATEWAY, (June 2020), available at <https://porkgateway.org/resource/consumer-attitudes-what-they-say-and-what-they-do/>.



197. Having calculated the Overcharge Amount for each type of Direct Purchaser, I model step 3 (Direct Purchaser sales made to Class Members) and 4 (pass-through) in Table 28 below. Damages to the Class must be limited to those pork products that ultimately were passed through by Direct Purchasers to Class Members, and not other end-consumers such as food services entities.³⁸⁰ Similarly, the Damages to the Class must be adjusted by the amount of the overcharge that Direct Purchasers pass-through. As shown in Part V.C, absolute dollar pass-through is slightly over 100 percent for Class Pork Products across all Direct Purchasers. I limit pass-through to 100 percent for the purposes of performing these calculations damages calculations.

198. As a conservative base case, I simply exclude all Direct Purchaser sales not made directly to a Retailer. Since Retailers, by definition, only sell to the Indirect Purchaser Class Members, the percentage of products sold to Retail Direct Purchasers that end up consumed by Class Members is 100 percent. Damages to Class Members in this case are the

³⁸⁰ Spoilage or shrinkage is not factored in this analysis, as resellers and retailers typically account for shrinkage and spoilage when setting their own prices.

Overcharge Amount paid by the Direct Purchaser multiplied by a pass-through rate of 100 percent. Under this conservative base case, I estimate that Class Member Damages are \$1.37 billion, or approximately \$10.67 per Class Member over the period.³⁸¹

199. Alternatively, I demonstrate it is possible to estimate the percentage of sales from each Direct Purchaser ultimately purchased by Class Members, by individually coding Direct Purchasers known to sell to Class Members in Defendants' data. Reviewing the top 95 percent of Distributors by net sales during the Class Period, I provisionally assess whether that Distributors makes sales to retailers, foodservice, or both. Keeping only those Distributors that sell exclusively to retail, I calculate that approximately 17.3 percent of Defendants' sales to Direct Purchasers in the Class Period, weighted by volume of commerce, were ultimately passed through to Class Members. If I conservatively assume the same ratio of sales from Distributors to Retailers occurs for Further Processing customers and Trader/Brokers, Class Member Damages are \$1.621 billion as shown in Table 28 below, or approximately \$12.63 per Class Member over the Class Period.³⁸²

³⁸¹ Calculated as \$1,370 million / 128.4 million Class Members.

³⁸² Calculated as \$1,621 million / 128.4 million Class Members.

VIII. THE EVIDENCE IS INCONSISTENT WITH UNILATERAL CONDUCT ABSENT COLLUSION

200. Competitive explanations for the observed price inflation, such as increases in supply or demand, are implausible. *First*, the qualitative evidence in Part III show that each Defendant actively participated in the sharing of their own competitively sensitive data, which means that all Defendants contributed to the alleged cartel's ability to charge artificially inflated prices. *Second*, my econometric regressions in Part IV explicitly control for external factors such as exogenous changes to supply or demand. *Third*, I show in this section that in the absence of a cartel, an individual Defendant could not have unilaterally and profitably implemented the observed price inflation over the Class Period. Therefore, it is not reasonable to conclude that any individual Defendant passively benefitted from the alleged cartel's inflated pricing without also contributing to the alleged cartel's anticompetitive conduct.

201. If individual Defendants could have profitably implemented the observed price inflation unilaterally, there would have been no need for members of the Cartel to systematically share sensitive information on prices, output, and costs to Agri Stat. Therefore, the mutually reinforcing qualitative and quantitative evidence is consistent with each Defendants' participation in the Challenged Conduct, and inconsistent with each Defendant engaging in unilateral conduct absent collusion.

A. The Observed Price Inflation Cannot Be Rationalized as a Response to Increasing Demand or Rising Costs for Pork Products

202. My econometric regressions in Part IV explicitly control for external factors such as exogenous changes to supply or demand that could affect wholesale pork prices. The regression model controls for pig prices, labor and plant processing costs, litter mortality, bacon processing costs, the Swine Flu consumer demand shock, the relative prices of beef and chicken, product recalls, national increases in U.S. welfare and productivity, and long-run industry wide trends. The remaining price inflation cannot be due to any of those factors.

203. Furthermore, as shown in Figure 1, the USDA reports that per-capita pork availability (a proxy for per-capita consumption) has remained “flat trend over the last three decades.”³⁸³ Other third-party data directly measuring pork consumption-per capita show no changes in consumer consumption patterns over the class period.³⁸⁴ Thus, the remaining price inflation cannot be due to unexplained consumer demand during the Class Period.

B. Unilateral Price Inflation of the Same Magnitude Over the Same Duration by Any One of the Defendants Likely Would Have Been Unprofitable

204. As noted in Part I.A, pork products are fungible, commoditized products. Without the ability to differentiate products, it is not reasonable to assume that any single

³⁸³ Jeanine Bentley, *U.S. Per Capita Availability of Red Meat, Poultry, and Seafood on the Rise*, Figure 1, USDA ECONOMIC RESEARCH SERVICE (Dec. 2, 2019), available at <https://www.ers.usda.gov/amber-waves/2019/december/us-per-capita-availability-of-red-meat-poultry-and-seafood-on-the-rise/>.

³⁸⁴ M. Shahbandeh, *U.S. Total Pork Production 2000-2020*, STATISTA (Jan. 28, 2022), available at <https://www.statista.com/statistics/194696/us-total-pork-production-since-2000/> and *Per Capita Consumption of Poultry and Livestock, 1965 to Forecast 2022, in Pounds*, NAT’L CHICKEN COUNCIL (updated Dec. 2021), available at <https://www.nationalchickencouncil.org/about-the-industry/statistics/per-capita-consumption-of-poultry-and-livestock-1965-to-estimated-2012-in-pounds/> (describing trends).

Defendant could have unilaterally and profitably implemented the economically significant price hikes over the Class Period. Had an individual Defendant attempted to inflate prices artificially by itself, customers could have defeated the price hike by switching to the same commodity product made by other processors. Moreover, if individual pork processors could have profitably implemented these price hikes on a unilateral basis, there would have been no need for Defendants to exchange information on production volumes and pricing via Agri Stat.

C. Plus Factors Amenable to Economic Analysis

205. I understand that courts consider certain “plus factors” in price-fixing cases to determine the existence of a price-fixing conspiracy, and that the “existence of these plus factors tends to ensure that courts punish ‘concerted action’—an actual agreement—instead of the unilateral, independent conduct of competitors.”³⁸⁵ I also understand that there is no “exhaustive list”³⁸⁶ of such plus factors, and that a plus factor is any fact that “tends to exclude the possibility”³⁸⁷ of independent conduct on the part of allegedly collusive firms. In prior sections, I have already reviewed extensive evidence consistent with collusion and inconsistent with unilateral conduct. Nevertheless, for completeness, below I provide a mapping of my economic analysis into the relevant plus factors. My focus here is on the plus factors that lend themselves to economic inquiry.

³⁸⁵ ABA PROOF OF CONSPIRACY at 69, citing *In re Flat Glass Antitrust Litigation*, 385 F.3d 360 (3d Cir. 2004) (quoting *In re Baby Food Antitrust Litig.*, 166 F.3d 112, 122 (3d Cir. 1999)).

³⁸⁶ *Id.* See also William E. Kovacic et al., *Plus Factors and Agreement in Antitrust Law*, 110(3) MICHIGAN LAW REVIEW 393-496 (2011) [hereafter Kovacic et al. (2011)].

³⁸⁷ *Monsanto Co. v. Spray-Rite Serv. Corp.*, 465 U.S. 752, 764 (1984).

1. Actions Against Unilateral Self-Interest

206. The evidence reviewed above is hard to reconcile with an alternative hypothesis that each Defendant acted unilaterally in its own self-interest.

207. If Defendants were operating in a competitive environment, then it would not be in Defendants' unilateral self-interest to share private information on, among other things, pricing. Doing so would create opportunities for competitors to undercut one another. For example, if firm *A* reveals to firm *B* the price it intends to quote to a customer, this creates an opportunity for firm *B* to win business by offering a slightly lower price than firm *A*. Indeed, a key objective of any cartel is to induce its members to overcome the unilateral competitive incentives to undercut the cartel price, reaping (short-term) profits at the expense of the rest of the cartel, and to focus instead on the collective (long-term) incentives of all cartel members to maximize joint profits.³⁸⁸ Similarly, competitors not participating in a conspiracy could also take advantage of a rival that shared information about its current or planned capacity (or output). With respect to planned capacity, if firm *A* reveals to firm *B* that it intends to cut capacity to drive up prices, then this creates an opportunity for firm *B* to win business by expanding its own capacity, thwarting firm *A*'s attempt at a price hike. Similarly, with respect to current capacity, each Defendant likely knows more about its own current capacity than its rivals do. If firm *A* reveals to firm *B* that its current capacity has been deliberately restricted to drive up prices, this again creates an opportunity for firm *B* to

³⁸⁸ See, e.g., MODERN IO at 122-154.

win business by expanding its own capacity. The fact that individual Defendants did not unilaterally lower prices is indicative of coordination.

a. *Output Restraint Despite Risk of Loss to Market Share*

208. I outline three methods Defendants used to reduce their output, even though in a competitive market this could lead to a loss of market share. These methods are: (1) Liquidation, which reduces herd size over the long term by taking sows out of production, (2) Harvest Reduction, which slows the pace of harvesting, and (3) Exports increases, exports can be ramped up to decrease domestic supply. There is qualitative evidence that Defendants used each of these methods, despite the risk of being undercut by competitors.

i. *Liquidation*

209. Liquidation reduces herd size over the long term, by taking sows (female breeders) out of production. This reduction cannot ramp back up quickly, because of the 19-month gestation period of hogs. Actions to increase price or reduce output (in the face of prices above marginal costs) that are not easily reversible are sometimes referred to as “perilous leading,” since the firm which “leads” the production drop or price increase is betting that other firms will follow suit. Areeda and Hovenkamp write that “the peril [of leading] will be great when following is doubtful *and* reversal is costly.”³⁸⁹ Because of the

³⁸⁹ See PHILLIP AREEDA AND HERBERT HOVENKAMP, FUNDAMENTALS OF ANTITRUST LAW § ¶ 1425d1 (1978) [emphasis in original]. See also *Kleen Prods. LLC v. Ga.-Pacific LLC*, 910 F.3d 927 (7th Cir. 2018) at 937 (“Firms take significant risks by reducing their output in an inflexible manner, unless there is an enforceable agreement in place to ensure that competitors will follow suit.”) and 938 (“Because perilous leading makes ‘little economic sense’ absent coordination, evidence of less-reversible supply restrictions supports an inference of conspiracy.”).

risk taken on by the leading firm, such actions rarely make sense as rational economic conduct in the absence of collusion.³⁹⁰

210. Record evidence shows that Defendant's liquidated the herd sizes they controlled. The years [REDACTED]

[REDACTED] In April of 2008, at the 21st Century Meeting of the National Pork Industry Conference [REDACTED]

[REDACTED]³⁹² and Clemens conducted [REDACTED]

[REDACTED] In May 2008, the Producer Packer Industry Council (PPIC)—whose members include processor defendants³⁹⁴—sent out an email after another industry meeting. It recommended that, given [REDACTED] the [REDACTED]

[REDACTED] And PPIC's industry-wide recommendation was developed with analytical assistance from Steve Meyer,³⁹⁶ [REDACTED]

[REDACTED]³⁹⁷

211. Herd liquidation was deemed an important method of output restraint early in the conspiracy, because removing sows (female breeders) from a producer's herd impacted

³⁹⁰ ABA PROOF OF CONSPIRACY at 70.

³⁹¹ Deposition of Daniel Groff (December 15, 2021) [hereafter Groff Dep.] at 341:2-4, 341:16-17.

³⁹² CLMNS-0000030331.

³⁹³ *Id.* at 332.

³⁹⁴ Taphorn Dep. at Exhibit 305 (PPIC meeting invitation sent to Clemens, Hormel, JBS, Seaboard, Smithfield and Tyson).

³⁹⁵ Taphorn Dep. at 89:3-90:8, 96:20-97:13 & Exhibit 306.

³⁹⁶ Taphorn Dep. at 99:17-22.

³⁹⁷ Groff Dep. at 282:17-24.

its size for years to come, without ability to quickly ramp back up. As Smithfield explained in December 2009, the company's reduction of [REDACTED]

[REDACTED] would [REDACTED]³⁹⁸ And as Tyson COO Jim Lochner explained on a February 2011 earnings call, [REDACTED]

[REDACTED]³⁹⁹ This Tyson chart depicts the [REDACTED]

212. The sow liquidations taking place early in the conspiracy had long lasting effects on producer herd size. Smithfield liquidated [REDACTED];⁴⁰¹ Tyson liquidated [REDACTED];⁴⁰² and Seaboard liquidated [REDACTED]⁴⁰³ And in 2012 producers [REDACTED].⁴⁰⁴

ii. Harvest Reduction

213. Harvest reduction occurs when Defendants decrease the number of plant hours, or suspend operations so that fewer hogs would be slaughtered, which temporarily decreases the domestic availability of pork products. Record evidence shows that Defendant's closely

³⁹⁸ TF-P-000159370 at -372; *see also* Deposition of Melvin Davis (December 16, 2021) at 118:16-119:6 ([REDACTED]).

³⁹⁹ TF-P-001535496 at -500.

⁴⁰⁰ TF-P-000741272 at native 13.

⁴⁰¹ TF-P-000159370 at -372.

⁴⁰² TF-P-000179765.

⁴⁰³ *Id.*; *see also* SBF0184924 (discussing Triumph's 2009 sow reduction).

⁴⁰⁴ HFC-PORKAT0000045312; *see also* TF-P-000642082 at -083 (February 2012 agenda for 21st Century [REDACTED] CLMNS-0000646890 at -891 (notes from August 2012 21st Century Emerging Leaders meeting: [REDACTED])).

monitored each other's harvest reductions.⁴⁰⁵ A 2016 internal Hormel email states that

[REDACTED] for [REDACTED]—which Hormel said was [REDACTED]

[REDACTED]⁴⁰⁶ Another Hormel email from 2014 discussed [REDACTED]

[REDACTED] and determined that it [REDACTED]

[REDACTED]⁴⁰⁷ In 2018, Hormel also analyzed the effect of Tyson schedule changes, [REDACTED]

[REDACTED]⁴⁰⁸ And an analyst in turn noted Hormel's announcement [REDACTED]

[REDACTED]⁴⁰⁹ and that [REDACTED]

[REDACTED]⁴¹⁰

214. Likewise, in 2016 an internal Smithfield email entitled [REDACTED]

[REDACTED]⁴¹¹ Another internal Smithfield

⁴⁰⁵ See, e.g., SMITHFIELD00861337 (describing Tyson with [REDACTED] Triumph [REDACTED] and Seaboard [REDACTED] TF-P-002007124 [REDACTED] TF-P-000039137 at -190 (Hormel's [REDACTED] SBF0222683 (Smithfield [REDACTED] and was [REDACTED])

⁴⁰⁶ HFC-PORKAT0000153244.

⁴⁰⁷ HFC-PORKAT0000068283.

⁴⁰⁸ HFC-PORKAT0000064704.

⁴⁰⁹ VG-P-0000005281.

⁴¹⁰ VG-P-0000005312.

⁴¹¹ SMITHFIELD00888909.

[REDACTED]

[REDACTED]⁴¹²

215. These reductions affected market prices. Seaboard discussed internally that a [REDACTED] price.⁴¹³ As Hormel put it in reference to Smithfield, [REDACTED]

[REDACTED]⁴¹⁴ Analysts reported that Tyson's

[REDACTED]⁴¹⁵

iii. Exports

216. As demonstrated in Part I.E and III.B1.e, exports reduces the amount of meat for sale domestically, which raises domestic prices. Defendants' documents reveal that they engaged in this third method of output restriction, increasing the export of pork, in order to reduce the amount of pork for sale domestically and so raise domestic prices.

217. Following a meeting with Agri Stats in early 2009, Tyson's [REDACTED] was that [REDACTED]⁴¹⁶ As Tyson's Noel White put it in an internal email in 2009, [REDACTED]

[REDACTED]⁴¹⁷ They succeeded. In 2010 Tyson reported internally that [REDACTED]⁴¹⁸

⁴¹² SMITHFIELD01944047.

⁴¹³ SBF0080489 at -493.

⁴¹⁴ HFC-PORKAT0000095315.

⁴¹⁵ TF-P-000036196 at -201.

⁴¹⁶ TF-P-000182443.

⁴¹⁷ TF-P-000518663.

⁴¹⁸ TF-P-000032520 at native 7.

And by 2011 Tyson reported that [REDACTED]

[REDACTED]⁴¹⁹ Industry analysts agreed: [REDACTED]

[REDACTED]⁴²⁰ So in 2012 Seaboard reported internally that it would [REDACTED]

[REDACTED]⁴²¹ And Tyson remained focused in 2012 on [REDACTED]

[REDACTED]⁴²³ and in 2013 on [REDACTED]

[REDACTED] to Japan.⁴²⁴

218. In 2014, Smithfield discussed internally that increasing pork exports created higher domestic pricing opportunities: [REDACTED]

[REDACTED]⁴²⁵ In

particular, Smithfield focused on China: [REDACTED]

[REDACTED]⁴²⁶ And industry analysts agreed that the [REDACTED]

⁴¹⁹ TF-P-000640982 at native 13.

⁴²⁰ SBF0294998 at -5007; *see also* TF-P-001573662 (“US Pork Exports Explode”).

⁴²¹ SBF0069222 at -225.

⁴²² TF-P-000122487 at -490.

⁴²³ TF-P-000187892.

⁴²⁴ TF-P-000021759.

⁴²⁵ SMITHFIELD00787019.

⁴²⁶ SMITHFIELD01164270 at -271.

[REDACTED]⁴²⁷ And Hormel commented internally that Smithfield's [REDACTED]

219. In 2016, Smithfield again predicted internally that with [REDACTED]
[REDACTED] the [REDACTED]
[REDACTED]⁴²⁹ Triumph likewise stated [REDACTED]
[REDACTED] by [REDACTED] the domestic market.⁴³⁰ And by the
end of 2016 Tyson reported that spreads were at an [REDACTED].⁴³¹
In 2017, the National Pork Board stated that [REDACTED]
[REDACTED]⁴³² and Steve Meyer agreed that export markets were [REDACTED]
[REDACTED] and were [REDACTED] And, in 2018, Seaboard CEO Rod
Brenneman appears to use his personal email to tell Doug Clemens of Clemens that he was
[REDACTED]
[REDACTED]⁴³⁴

220. In fact, exports were so important to processor defendants' overall strategy that they would shoulder export costs—or even export at a loss—because the profit associated

⁴²⁷ SMITHFIELD00321244 at -260.

⁴²⁸ HFC-PORKAT0000033238; CLMNS-0000298048 at -049 [REDACTED]
[REDACTED] in 2015).

⁴²⁹ SMITHFIELD04416490 at -491; *see also* SMITHFIELD01319003 at -047 (export markets to [REDACTED])

⁴³⁰ TRI0000005773.

⁴³¹ TF-P-000822515 at -517; *see also* TF-P-000872642 at -882 (reporting in 2017 that [REDACTED])

⁴³² SMITHFIELD00308346.

⁴³³ AGSTAT-P-0002826924.

⁴³⁴ CLMNS-0000031400.

with higher domestic prices would outpace losses from sales abroad. For example, a Tyson email states that [REDACTED]

[REDACTED]⁴³⁵ And an internal Smithfield exchange asked [REDACTED]⁴³⁶ Smithfield employee Dhamu Thamodaran responds: [REDACTED]

[REDACTED]

[REDACTED]⁴³⁷

221. Thus, processor defendants were committed to increasing exports to increase domestic margins. In 2014, for example, Smithfield's [REDACTED]

[REDACTED]⁴³⁸ Tyson's [REDACTED]⁴³⁹ JBS had

[REDACTED]⁴⁴⁰ And Hormel experienced [REDACTED]

[REDACTED]⁴⁴¹

⁴³⁵ TF-P-000076737.

⁴³⁶ SMITHFIELD00872455 at -456.

⁴³⁷ *Id.* at -455; *see also* HFC-PORKAT0000098220 [REDACTED]

⁴³⁸ TF-P-000039137 at -168.

⁴³⁹ TF-P-000039217 at -228.

⁴⁴⁰ TF-P-000039137 at -158.

⁴⁴¹ *Id.* at -189.

222. Indeed, even when the [REDACTED]

[REDACTED].⁴⁴² Internal Smithfield notes from a National Pork Industry Conference during the supposed PEDv crisis— [REDACTED]

[REDACTED]⁴⁴³—stated that [REDACTED]

[REDACTED]⁴⁴⁴

2. Defendants Publicly Announced Planned Output Reductions

223. Public announcements of planned output reductions or price increases can be a way of signaling a firm's intentions to its rivals. Such signals can facilitate collusive output and pricing decisions.⁴⁴⁵ Certain types of public announcements also serve legitimate purposes—for example public companies have disclosure obligations to shareholders, and some public disclosure of pricing plans may reduce customer search costs. However, many

⁴⁴² HFC-PORKAT0000100919 at -920. And processor defendants' export of pork included cuts sold in the U.S. *See* Grannas Dep. at 56:8-13 (Triumph's pork exports included loin); TRI0000107539 [REDACTED]

TRI0000050781 at -783 [REDACTED]

SBF0149705 [REDACTED]

TF-P-000218497 [REDACTED]

HFC-PORKAT0000209857 at -858 [REDACTED]

[REDACTED]; CLMNS-0000655538 [REDACTED].

⁴⁴³ *See, e.g.*, SMITHFIELD00895789 [REDACTED]

⁴⁴⁴ SMITHFIELD03684944 at -946.

⁴⁴⁵ Kovacic et al. (2011) at 418-420.

of Defendants' announcements of planned output reductions appeared to serve no purpose other than to facilitate collusive output reductions. Absent collusion, such announcements would be against a firm's unilateral self-interest. Competitors would not want to reveal their planned business strategies to their rivals. For example, if one competitor knew that another was planning to reduce its future output, especially in a way that would be difficult to reverse in the short run, that competitor could expand its own production in response to win customers and increase sales and market share. From the perspective of each individual firm, unilaterally lowering output would not be profitable after hearing of a rival's planned reductions. Each would be better served keeping output at a higher level, and winning market share.

224. Beginning in 2008, Smithfield described itself in its 2008 Annual Report as

[REDACTED]

[REDACTED] which [REDACTED]

[REDACTED]⁴⁴⁶

225. Tyson was listening as Smithfield's public signaling continued in 2009. On a March 12, 2009 earnings call, CEO Larry Pope said, [REDACTED]

[REDACTED] But it [REDACTED]

[REDACTED] Internally Tyson was bemused by Smithfield's characterization of itself as the [REDACTED]⁴⁴⁹ On June 16, 2009, Smithfield stated in a Q4

⁴⁴⁶ SMITHFIELD02229051 at -056.

⁴⁴⁷ TF-P-000081812.

⁴⁴⁸ *Id.*

⁴⁴⁹ *Id.*

2009 earnings call that [REDACTED] because [REDACTED]
 [REDACTED] Tyson's internal
 response to this was that Smithfield [REDACTED]
 [REDACTED]⁴⁵¹ (And an industry analyst used as a conduit by some of the processor
 defendants would later describe this statement as a [REDACTED]⁴⁵² But that did not stop
 Smithfield.

226. In a press release of the same date, Smithfield stated [REDACTED]
 [REDACTED] and that it was [REDACTED]
 [REDACTED] which [REDACTED]
 [REDACTED]
 [REDACTED]⁴⁵³ By the next month, Cleveland Research Company reported
 that Tyson announced in July 2009 that [REDACTED]
 [REDACTED] which [REDACTED]
 and [REDACTED]
 [REDACTED]⁴⁵⁴ The CEO of Clemens, in turn, was paying
 attention to Tyson.⁴⁵⁵ And Tyson itself engaged in further public signaling in August 2009:

⁴⁵⁰ TF-P-001122858 at -868 and -874.

⁴⁵¹ TF-P-000014052 at -053.

⁴⁵² KERNS00361657.

⁴⁵³ SMITHFIELD01062874 at -877.

⁴⁵⁴ TF-P-000179765. Smithfield Executive VP Robert Manly threatened to publish a letter describing the CEO of Seaboard as a [REDACTED] if it did not follow through on herd liquidation given Seaboard's recognition of the industry's need for collective action. SMITHFIELD02010630.

⁴⁵⁵ CLMNS-0000022228 [REDACTED]

[REDACTED] *see also* TF-P-000179765.

[REDACTED]

[REDACTED]⁴⁵⁶ In September Smithfield's Pope acknowledged that he had [REDACTED]

[REDACTED]

[REDACTED]⁴⁵⁷ In 2010 and 2011 Smithfield and JBS continued to state publicly that [REDACTED]

[REDACTED] (JBS).⁴⁵⁸

227. By 2013 the industry had shifted its public signaling to a focus on increasing exports as a means of reducing supply. In January 2013, Tyson was tracking a Smithfield report that its [REDACTED] and in March 2013 a JBS report that the [REDACTED]

[REDACTED]⁴⁵⁹ Likewise, in January 2014 Tyson tracked a Smithfield Earnings Overview report that it [REDACTED] and in May 2014 a JBS report of [REDACTED]

[REDACTED]⁴⁶⁰ As Smithfield COO Kenneth M. Sullivan plainly said on an October 2015 earnings call: [REDACTED]

[REDACTED]⁴⁶¹ Smithfield publicly reminded the industry in a Q2 2014 earnings call that it has to [REDACTED]

⁴⁵⁶ TF-P-000014545 at -550.

⁴⁵⁷ TF-P-000014646 at -655.

⁴⁵⁸ TF-P-000083321 at -332 (Smithfield); TF-P-000535017 at -025 (JBS).

⁴⁵⁹ TF-P-000046204 at -232; TF-P-000046292 at -312.

⁴⁶⁰ TF-P-000018335 at -375; TF-P-000039137 at -158 and -160.

⁴⁶¹ SMITHFIELD01071523 at -538 and -539.

because [REDACTED]

3. Defendants Privately Communicated Planned Output Decisions with Each Other

228. I understand that sharing of pricing information has also been recognized as a plus factor in antitrust cases,⁴⁶³ particularly where “exchanges of information occur at higher levels in a defendant’s organization.”⁴⁶⁴ The evidence reviewed in Part III indicates not only that pricing information was shared, but that it occurred systematically and regularly. Sharing such information when not otherwise required is against a firm’s self-interest because it puts the firm at a strategic disadvantage. As with public signaling of output reductions, absent collusion, another firm could react to such information by expanding output and attempting to steal market share. Documenting shared privileged business strategies with competitors in private carries risk. Defendants are trained not to email each other about the conspiracy.⁴⁶⁵ Despite such training, documentary evidence of private communications with competitors still exists, whether directly or via conduits.

⁴⁶² TF-P-000070892 at -906.

⁴⁶³ ABA PROOF OF CONSPIRACY at 83 (citing *United States v. Container Corp. of America*).

⁴⁶⁴ *Id.* at 85 (citing *In re Flat Glass Antitrust Litigation*).

⁴⁶⁵ TF-P-000205973, native 35, 40, 45-47 in a June 2011 Tyson for all-hands meeting Executive Vice President and General Counsel David Van Bebber cautioned employees to [REDACTED]

[REDACTED] The following are examples of [REDACTED] that should not be sent: 1. [REDACTED]

And 2. [REDACTED]

229. At the same time as Smithfield, Tyson, and JBS were publicly signaling the need for liquidation and later accelerating exports, other processor defendants communicated privately about liquidation and harvest reduction. In July 2009 Seaboard emailed Tyson to see whether Tyson was [REDACTED], and, after Tyson responded, Seaboard commented internally: [REDACTED]

[REDACTED]⁴⁶⁶

230. Likewise, processor defendants closely monitored each other's [REDACTED]

[REDACTED]⁴⁶⁷ In 2012, Tyson reported internally: [REDACTED]

[REDACTED] which was [REDACTED]

[REDACTED]⁴⁶⁸ Tyson further reported that [REDACTED]

[REDACTED]⁴⁶⁹ Likewise, in 2012, Smithfield reported internally that [REDACTED]

[REDACTED] including Tyson with [REDACTED]

[REDACTED] Triumph [REDACTED] and

Seaboard [REDACTED]⁴⁷⁰ Similarly, in 2013, an internal Smithfield email queries, [REDACTED] with the response that [REDACTED]

⁴⁶⁶ SBF0181317.

⁴⁶⁷ SMITHFIELD00460210 at -211.

⁴⁶⁸ TF-P-000642134.

⁴⁶⁹ *Id.*

⁴⁷⁰ SMITHFIELD00861337.

[REDACTED]⁴⁷¹ And Seaboard also reported internally in 2013 that it was [REDACTED]⁴⁷² For example,

[REDACTED]

[REDACTED]⁴⁷³

231. In 2014, Tyson in turn reported internally that [REDACTED]
[REDACTED]⁴⁷⁴ and that Hormel's [REDACTED]⁴⁷⁵ Hormel in turn discussed internally that Smithfield [REDACTED]

[REDACTED]⁴⁷⁶ And in 2014 Tyson was compiling the [REDACTED]

[REDACTED]

[REDACTED]⁴⁷⁷ In 2017, Clemens reported internally from an industry event that with respect to the egg industry, [REDACTED]

[REDACTED]

[REDACTED]

232. In 2018 Seaboard reported internally that Smithfield [REDACTED]
[REDACTED] and was [REDACTED]⁴⁷⁹ A

⁴⁷¹ SMITHFIELD01228025 at -027.

⁴⁷² SBF0127255 at -258.

⁴⁷³ SBF0077342 at -346.

⁴⁷⁴ TF-P-002007124.

⁴⁷⁵ TF-P-000039137 at -190.

⁴⁷⁶ HFC-PORKAT0000095315 at -316.

⁴⁷⁷ TF-P-002006751; *see also* KERNS00022298 [REDACTED]

[REDACTED]).

⁴⁷⁸ Groff Dep. at 303:23-304:12.

⁴⁷⁹ SBF0222683.

2018 Tyson email similarly states, [REDACTED]

[REDACTED]⁴⁸⁰ A 2018 correspondence between JBS and Hormel indicated that JBS was

[REDACTED]⁴⁸¹ And in 2018 Hormel also internally discusses an email regarding Tyson schedule changes, [REDACTED]

[REDACTED]⁴⁸²—and cautions to [REDACTED]

[REDACTED] Thus, the [REDACTED] as Hormel described it, was very effective.⁴⁸⁴ And tight supplies would allow processor defendants [REDACTED]

[REDACTED]

4. Market Concentration and Structure

233. When shown in conjunction with other plus factors, I understand that market concentration and structure can “constitute probative evidence of a conspiracy.”⁴⁸⁶ Economists recognize that collusion is more likely to occur in highly concentrated

⁴⁸⁰ TF-P-002146565.

⁴⁸¹ HFC-PORKAT0000064622; HFC-PORKAT0000068950.

⁴⁸² HFC-PORKAT0000064704 at -706.

⁴⁸³ HFC-PORKAT0000130969. *See also* Deposition of Phil Clemens (March 10, 2022) at 73:19-74:7 (testifying that [REDACTED])

[REDACTED] *Id.* at 79:10-80:22; TF-P-001543827 (Walmart memo advising participants in pork supply chain discussion to [REDACTED])

⁴⁸⁴ HFC-PORKAT0000049201 at -202.

⁴⁸⁵ Peil Dep. at 229:21-230:3; *see also* Taphorn Dep. at 107:5-11 [REDACTED]

⁴⁸⁶ ABA PROOF OF CONSPIRACY, *supra*, at 78 (citing *In Re High Fructose Corn Syrup Antitrust Litigation*).

markets.⁴⁸⁷ Such is the case here. As explained in Section II.A.5 above, Defendants collectively account for 80 percent of U.S. pork output. Thus, when the market shares of the alleged cartel's members are aggregated, the processed pork marketplaces are shown to be highly concentrated.⁴⁸⁸

234. Similarly, economists have noted that the probability of collusion in an industry increases if other products cannot easily be substituted for the product in question.⁴⁸⁹ As discussed in Part II.A.4, pork has no close demand substitutes, and the market faces substantial barriers to entry along with high levels of fixed costs.

235. Finally, economists also recognize that the more standardized a product is, the easier it is for competing firms to collude.⁴⁹⁰ As shown in Section I.A, pork is a standardized commodity product. Product standardization has also been recognized to make other markets

⁴⁸⁷ See, e.g., Hay and Kelley at 14-15 (citing “Fewness of Numbers” and “Concentration” as “Factors Which Facilitate Coordination”). See also *Merger Guidelines* at 5.3; *Id.* at 7.2, (“Coordinated conduct can harm customers even if not all firms in the relevant market engage in the coordination, but significant harm normally is likely only if a substantial part of the market is subject to such conduct. The prospect of harm depends on the collective market power, in the relevant market, of firms whose incentives to compete are substantially weakened by coordinated conduct. This collective market power is greater, the lower is the market elasticity of demand.”).

⁴⁸⁸ As explained in Part II.A.5, if each member of the Cartel were treated as an independent horizontal competitor, the markets for the Class Products would not be considered highly concentrated under the Antitrust Agencies’ *Horizontal Merger Guidelines*. However, the Antitrust Agencies recognize that market shares should be aggregated across firms to the extent that they are working in concert with each other.

⁴⁸⁹ ECONOMICS OF COLLUSION at 151, (“The profitability of elevated cartel prices can be reduced by the presence of substitute products because buyers can respond to the elevated cartel prices by switching to substitute products.”).

⁴⁹⁰ Hay and Kelly at 15 (“Product homogeneity is among the characteristics frequently cited as facilitating collusive behavior[.]”).

more susceptible to collusion in conjunction with inelastic market demand.⁴⁹¹ As shown in Section II.A.3, empirical evidence also indicates that the market demand for pork is inelastic. Standard economic principles show that a firm's own-price elasticity depends on the supply elasticity of its rivals.⁴⁹² In the absence of the Challenged Conduct, the supply elasticity of the firm's rivals would have been higher, increasing the own-price elasticity for each Defendant, and lowering the profit-maximizing price that each Defendant could have charged.⁴⁹³

5. Opportunities to Collude

236. Processor defendants had many other opportunities to collude, including at industry meetings, during private conversations, and as part of other conspiracies. For example, [REDACTED]

[REDACTED].⁴⁹⁴ The Pork Club [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED].⁴⁹⁵ In 2011 the group [REDACTED]

⁴⁹¹ ABA PROOF OF CONSPIRACY, *supra*, at 79 (citing *United States v. United States Gypsum Company*). *See also* Hay and Kelley at 15, (“The more inelastic is industry demand, the greater are the potential rewards to the price fixers.”).

⁴⁹² Mathematically, $ED = EM/S + ES(1 - S)/S$. Here, ED is the own-price elasticity for a particular firm, EM is the market demand elasticity, ES is the supply elasticity of the firm's rivals, and S is the firm's market share. *See, e.g.,* William Landes & Richard Posner, *Market Power in Antitrust Cases* 94(5) HARVARD LAW REVIEW 937-996, 945 (1981) [hereafter Landes & Posner].

⁴⁹³ Landes & Posner at 942.

⁴⁹⁴ Groff Dep. at 68:12-14, 69:4-6, 73:16-75:19, 119:13-17, 122:2-123:14.

⁴⁹⁵ Deposition of Corwyn “Cory” Bollum (December 1, 2021) at 199:23-200:10.

[REDACTED]⁴⁹⁶ [REDACTED] meetings took place as well.⁴⁹⁷ In any event, as Dan Groff from Clemens put it in his notes, [REDACTED]

[REDACTED]⁴⁹⁸ So when a colleague was accepted into the Pork Leadership Institute, he told her to [REDACTED]

237. Processor defendants also communicated directly. For example, in September 2013 Cargill's Louis-Paul Ricard emailed Tyson CEO Donnie Smith inviting Tyson to visit Cargill headquarters in Minnesota to [REDACTED]

[REDACTED]⁵⁰⁰ In 2014 there was an email from Cargill CEO David McLennon to Tyson CEO Smith saying, [REDACTED]

[REDACTED] In 2015 Smithfield CEO Larry Pope and JBS President Wesley Batista exchanged emails [REDACTED]⁵⁰² And Clemens CFO Josh Rennells testified

that [REDACTED]⁵⁰³

⁴⁹⁶ 21CFORUM-0000002530.

⁴⁹⁷ TF-P-000128447 [REDACTED]

⁴⁹⁸ CLMNS-0000670442.

⁴⁹⁹ CLMNS-0000522277; *see also* SMITHFIELD00948364 at -365 (meeting intel: [REDACTED])

[REDACTED] HFC-PORKAT0000056924 (meeting intel: [REDACTED])

⁵⁰⁰ TF-P-000726140.

⁵⁰¹ TF-P-000748201; *see also* TF-P-001162227 and TF-P-001162228 (itinerary for a high-level Cargill-Tyson meeting at a Tyson airplane hangar on Feb. 3, 2015).

⁵⁰² SMITHFIELD00818976.

⁵⁰³ Deposition of Joshua Rennells (February 24, 2022) at 249:25-250:1.

238. There were ample opportunities for processor defendants to communicate both publicly and privately—in addition to the systematic communication that took place via Agri Stats reporting.

6. Involvement in Other Conspiracies and Government Investigations

239. I understand that another plus factor considered by courts is involvement in other price-fixing conspiracies.⁵⁰⁴

240. As set forth below, both Agri Stats and Tyson have been involved in a separate conspiracy involving chicken processors. Multiple years into the class action litigation, the United States Department of Justice moved to intervene and its investigation has resulted in multiple indictments for bid rigging and price fixing.⁵⁰⁵

FIGURE 17: AGRI STATS AND TYSON'S INVOLVEMENT IN OTHER CONSPIRACIES

<i>In re Pork Antitrust Litig.</i> , No. 18-cv-1776 (JRT) (June 1, 2021), ECF No. 780		<i>In re Broiler Chicken Antitrust Litigation</i> , No. 16-cv-08637 TMD (Aug. 7, 2020), ECF No. 3748	
Defendants	Settlement	Defendants	Settlements with consumer IPP class
Agri Stats		Agri Stats	
Tyson		Tyson	\$99 million
JBS	\$20 million	Koch	
Smithfield		Pilgrim's (subsidiary of JBS)	\$75.5 million
Hormel		Perdue	
Clemens		Sanderson	
Seaboard		Wayne Farms	

⁵⁰⁴ See ABA PROOF OF CONSPIRACY, *supra*, at 91 (citing *In re Flash Memory Antitrust Litigation* and *In re Static Random Access Memory Litigation*). See also *Merger Guidelines* §7.2 (“The Agencies presume that market conditions are conducive to coordinated interaction if firms representing a substantial share in the relevant market appear to have previously engaged in express collusion affecting the relevant market, unless competitive conditions in the market have since changed significantly.”).

⁵⁰⁵ See Superseding Indictment, *United States v. Penn*, 1:20-cr-00152-PAB (D. Co. Oct. 6, 2020), ECF No. 101.

<i>In re Pork Antitrust Litig.</i> , No. 18-cv-1776 (JRT) (June 1, 2021), ECF No. 780		<i>In re Broiler Chicken Antitrust Litigation</i> , No. 16-cv-08637 TMD (Aug. 7, 2020), ECF No. 3748	
Defendants	Settlement	Defendants	Settlements with consumer IPP class
Triumph		Mountaire	
		Peco	\$1.9 million
		Foster Farms	
		House of Raeford	
		Simmons	
		Fieldale	\$1.7 million
		George's	\$1.9 million
		O.K. Foods	
		Claxton	
		Harrison	
		Mar-Jac	\$1 million

241. Economists recognize that “[f]irms’ expectations about their competitors’ propensity to cooperate can have a significant impact on the success of collusion,”⁵⁰⁶ and that these expectations “may be influenced by previous interaction [and] interaction in other markets....”⁵⁰⁷ In addition, “[t]rust is also important to coordinating on a collusive equilibrium[.]”⁵⁰⁸ Thus, if horizontal competitors already know they can trust each other to collude, they are, all else equal, more likely to do it again.

242. When participants in a cartel interact repeatedly over time (as Defendants did in this case), economists refer to it as a “repeated game” or “dynamic game.”⁵⁰⁹ When a

⁵⁰⁶ Levenstein & Suslow (2006) at 67-68.

⁵⁰⁷ *Id.*

⁵⁰⁸ *Id.* at 68-69 (explaining that “[t]rust is also important to coordinating on a collusive equilibrium;” citing studies of cartels in the diamond industry, the rayon industry, and the steel industry).

⁵⁰⁹ See, e.g., Louis Kaplow, An Economic Approach to Price Fixing, 77(2) *Antitrust LAW JOURNAL* 343-449, 350 (2011) (“The analysis of firms’ interactions employs repeated games because they can capture the sort of strategic interaction that makes successful coordinated oligopoly pricing possible.”).

cartel operates in a repeated-game environment, each participant recognizes that its long-run profits will be maximized when it charges a price above the competitive level.⁵¹⁰ In a repeated game, the incentive for an individual firm to defect from the cartel must be weighed against the entire stream of future profits that the firm would enjoy if it did not defect.⁵¹¹ The more that cartel participants interact repeatedly over time, and the more that they learn to trust each other to continue charging supra-competitive prices, the more successful the cartel will be.⁵¹² Thus, horizontal competitors that have colluded during a given time frame (all else equal) are more likely to do so during other time frames. The evidence demonstrates that anticompetitive information exchanges in this case did indeed involve repeated interaction over time during the Class Period.

IX. CONCLUSIONS

243. For the forgoing reasons, I conclude that that economic injury and aggregate damages can be reliably demonstrated using methods and data common the Class.

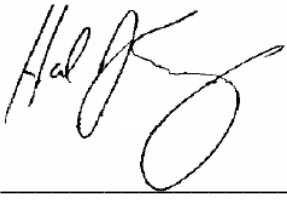
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⁵¹⁰ *Id.* at 350-352.

⁵¹¹ *Id.* In economics, the extent to which an economic agent values future streams of income is measured by the “discount factor.” See ROBERT GIBBONS, GAME THEORY FOR APPLIED ECONOMISTS 89-90 (Princeton University Press 1992). Collusion can be sustained in a dynamic environment provided that firms do not discount the future to such an extent that future profits are worth little to them in comparison with the immediate profits to be gained by defecting from the cartel. *Id.* at 106 (“That is, the gain this period from deviating must not exceed the discounted value of the loss next period from the punishment.”). See also Levenstein & Suslow (2006) at 46 (“Repeated interaction (over time or across markets) can, in principle, by providing the incentive of future collusive profits, deter firms from cheating and allow them to escape the Prisoners’ Dilemma.”).

⁵¹² Levenstein & Suslow (2006) at 67-69.

Hal J. Singer, Ph.D.:



Executed on May 2, 2022.

APPENDIX 1: CURRICULUM VITAE OF HAL J. SINGER



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ECON ONE, Washington, D.C.: Managing Director 2018-present.

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ECONOMISTS INCORPORATED, Washington, D.C.: Principal 2014-2018.

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Finalist, Outstanding Antitrust Litigation Achievement in Economics, American Antitrust Institute, *Tennis Channel v. Comcast*, Dec. 4, 2013.

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Memberships

American Economics Association

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Reviewer

Journal of Risk and Insurance

Journal of Competition Law and Economics

Journal of Risk Management and Insurance Review

Journal of Regulatory Economics

Managerial and Decision Economics

Telecommunications Policy

APPENDIX 2: MATERIALS RELIED UPON

“SeaboardSD0009(Hog Production Report).”

10.24.21, Tyson batch 81.41, Mark

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APPENDIX 3: APPENDIX TABLES

